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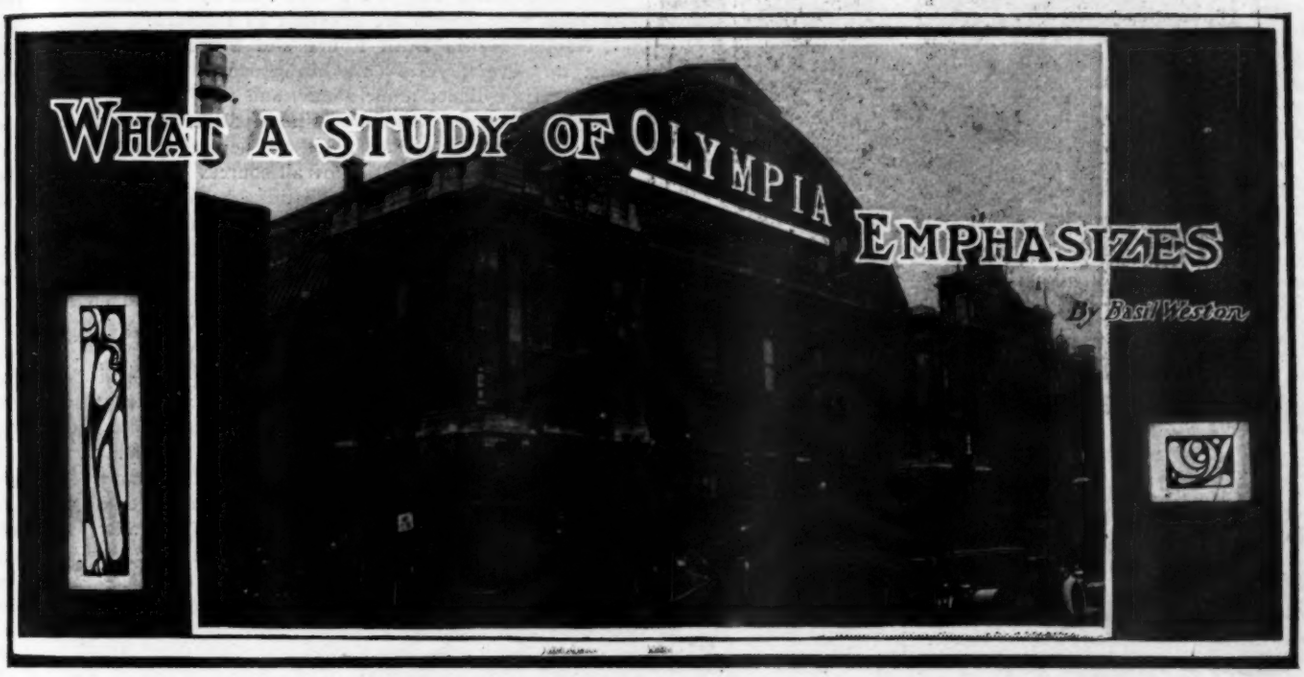
THE AUTOMOBILE

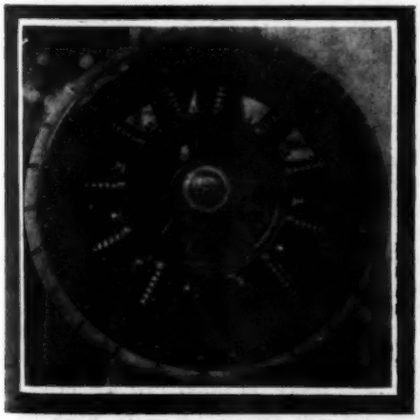
# What a Study of Olympia Emphasizes

By Basil Weston



The Great Olympia Show Building, London, Where Great Britain's Exhibition of Automobiles Is Held Annually

LONDON, Nov. 13—A detailed examination of the seven hundred or so cars exhibited requires at least two days, and at the end of this period one is driven to the conclusion that design is even further from finality than last year. Instead of settling down to one or more standard types the makers are all tending to develop their own ideas as to necessary improvements; with the result that almost every car presents new features of note—some useful and sound—others apparently the reverse. This is, perhaps, a natural stage in the development of the car. Some one has said, "It took five years to get the car to go and another five to keep it going." Apparently we are now in the third quinquennial period, in which makers are going to get the car to keep going well and without any attention from the user. Perhaps after this stage has been successfully passed we will find the industry settling down to the production of certain stereotyped models just as in the case of the bicycle industry which preceded it.

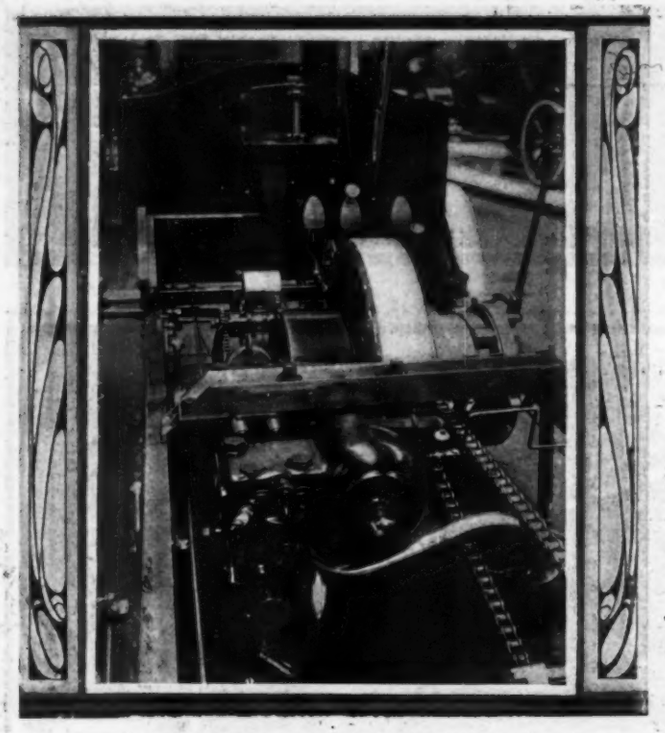


Latest Spring Wheel—The Sirdar

To return to the show. It may be interesting to review the stands in turn, noting down the main features which attract attention. Dealing with the cars in descending order of power and cost, there are a dozen firms which still favor the $5,000 car in spite of the high taxation ($200 per annum) likely to be imposed on this class. Rolls-Royce and Sheffield-Simplex specialize on big six-cylinder cars, while Napier, Daimler, and many others also favor the 60-horsepower, six-cylinder model, with the addition of other cars of more popular style and power.

The Rolls-Royce car is rated at 40-50 horsepower—this being an exception to the usual rule whereby British cars are known according to their R.A.C. rating. The six cylinders are cast in two blocks of three, a feature which has been copied by several other makers this year. All the valves are on one side, while the car-

Hydraulic Transmission—Torbina Car



The Adams Car—"Only Pedals to Push"

bureter, pump, magneto and distributor for the battery ignition find accessible places on the other side. The inverted leather cone clutch and three-speed gearbox are of standard type, but the bevel-driven rear axle is provided with a triangular torque stay and radius rods of unusual proportions, for the makers attach special importance to this in connection with smooth driving and braking. The action of the expanding brakes in the rear hubs is equalized by means of a small differential gear placed in connection with the cross shaft which actuates the two brake cables. The springing and other features of the chassis are unaltered from last year with the exception that an air pump driven by the propeller shaft is used to provide the pressure for the fuel tank at the rear. This is in line with a movement of which many examples may be observed.

The most noticeable feature on the Sheffield-Simplex 45-horsepower, six-cylinder car is its "gearlessness," which, however, turns out to be more apparent than real. There is certainly no gearbox, in the ordinary sense of the word, and a straight propellor shaft extends from the clutch to the rear axle, giving a direct drive on which the car climbs hills with remarkable efficiency. In order to give the reverse gear, however, a small arrangement of gearing had to be provided at the rear axle

Motor and Clutch Layout of the Crossley

bevel casing, and once this step was taken it was found no further trouble to arrange a low forward gear for emergency use. Hence this car is more correctly termed "gearboxless" than gearless. Another feature of interest is the control arrangement. There are the usual side levers and also two pedals. The left pedal operates first the clutch and afterwards the brake, while the second pedal, which is really a footplate sliding sideways, operates the carburetor throttle. This arrangement is found to be much more convenient to use than an accelerator pedal of the usual type. The front wheels are fitted with band brakes, which are operated by the foot pedal, while the rear wheel expanding brakes are controlled by the side lever. Detachable wire wheels are provided as standard.

**Napier Makes Both Fours and Sixes**—The Napier firm has, for several years past, abandoned its former practice of making six-cylinder models only, and now provides cars of all types and powers, from the 10-horsepower, two-cylinder to the 90-horsepower, six-cylinder. On all the cars great attention has been paid to the elimination of all sources of noise, so that the firm has felt justified in adopting the descriptive name of "Noiseless Napiers." The larger models, and also the 15-horsepower type, are almost unaltered from last year, but the 15-horsepower car, listed at $1,750 chassis, has been improved in several ways. The four cylinders, 3 1-4 inches diameter and 5 inches stroke, are cast in pairs, and the valves, which are all on one side, are enclosed by detachable cover plates. The carbureter is of the "vaporizing tube" type, in which the petrol spray is completely vaporized in a narrow heated tube before the main air supply is added. This system has the advantage of enabling the hot jacket to vaporize the petrol in a thorough manner without decreasing the density of the charge. A single aluminum casting is used for the engine crankcase and the gearbox, with the result that the driving shafts are always in line. Roller bearings are used in the gearbox—an innovation for British design. The matter of ground clearance has been given careful attention, and a full 14 inches separates the lowest point of the engine from the ground. One of these 15-horsepower cars is shown with a special body for colonial use. Every tool or cooking utensil likely to be required is stowed away, and the hood is so arranged that it can be detached and used as a tent.

An equally interesting "15" finds place on the Daimler stand, this car and the 33-horsepower, six-cylinder being the new models for 1910. The other three cars—22, 38, and 57-horsepower—which proved so successful during the past season, have been retained almost without alteration, the only new features being the provision of a new semi-automatic lubrication system, whereby a pump supplies oil to troughs below the connecting rods, and the adoption of supplementary spiral springs at the rear of the frame. All the cars have, of course, Knight sliding sleeve engines.

The 15-horsepower model has already shown its popularity before the show commenced, and a very large demand is anticipated. The four cylinders are 80 x 130 mm. bore and stroke, with the usual Daimler detachable heads. These easily removed heads are found to be an advantage in that the combustion chamber can be quickly cleaned if this is found desirable after a season's running. There is no direct water connection between the jackets in the heads and those in the cylinders. Instead, the heads are connected in series, and the water passes through on its way to the radiator.

This last consists of plain flat copper tubes, without any gills or fins, which are arranged vertically, with their edges forward. The efficiency is considerably greater than with a radiator of the usual gilled tube variety, so that a smaller weight of water need be carried. The leather cone clutch and gearbox are of the standard type, and the drive to the rear axle is by a steel worm which actuates a phosphor-bronze worm wheel. The worm is placed below the axle, and hence, in order that the drive shall be in a straight line, and not impose excessive work on the universal joints, the engine is inclined at an angle of about 15 degrees. By reason of the arrangement of the oil troughs, this

inclination has no effect on the working of the engine. This car is fitted with detachable wire wheels, and is made in two types, the roadster, with inclined steering, and the tourist. The price of the tourist four seater is $2,225, complete with lamps.

**Product of a Battleship Maker**—Like the Napier and Daimler firms, the Wolseley Company, which is a branch of Vickers & Maxim, the battleship builders, makes cars of all powers from 10 up to 60 horsepower. All have four cylinders, except the 10-horsepower, with two cylinders, and the 50-60-horsepower, which has six cylinders, all cast together—a practice also followed by the Panhard Company on their new 30-horsepower, live-axle car. The Wolseley engine is cast without the water jacket, this being formed of sheet steel, and fastened in place with screws. The valves are all on one side, and are inclined at an angle to the vertical, so that the combustion chamber is slightly lessened in size. The engine is lubricated by the splash of oil from the troughs situated beneath the connecting rods, these troughs being kept filled by a pump, as in the case of the Daimler. The carbureter has two jets, this being the usual custom with all engines of over 15 horsepower. This car has a four-speed gearbox and bevel drive, but the smaller Wolseleys have three speeds and worm device. All models have the road wheels fitted with Timken roller bearings.

Chassis of the French La Buire, an Example of the Popular 18-Horsepower Class

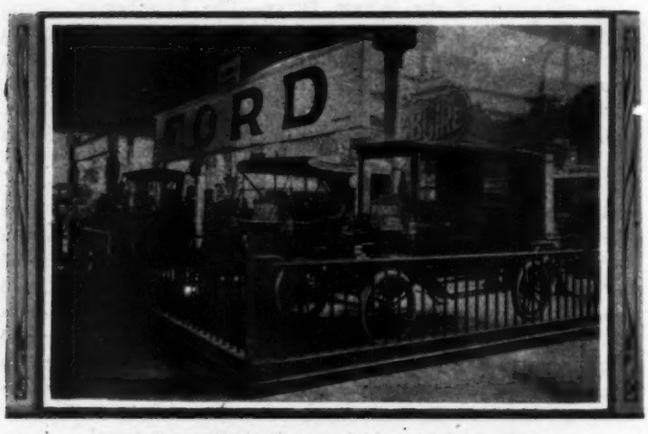
Two other well-known British cars which have in common several novel features are the Lanchester and N. E. C. (New Engine Company). Both of these cars have the engine beneath the front seat, and yet so arranged that all necessary parts are readily accessible. Both have also the engine inclined, so that the drive to the worm wheels at the rear axle is in a straight line. The Lanchester engine has vertical cylinders, four for the 20-horsepower, six for the 28-horsepower model, while the N. E. C. has four horizontal cylinders opposed in pairs. Dealing with the remaining features of the N. E. C. first; the engine can be started by the driver by means of a handle on the dashboard, the latter being hollow and carrying the petrol and oil. The steering wheel is arranged to tilt up out of the way, so that the driver may seat himself more easily. The brakes are water cooled, and the operating gear is arranged so that the throttle is closed when either brake is applied. The four springs are almost flat, and the ends can slide through the brackets, while radius rods prevent any movement of the axles. The gearbox gives four speeds, the gear being brought into mesh by an eccentric movement instead of the usual sliding action. The Lanchester, on the other hand, retains the three-speed epicyclic gear, which has always been one of its special features. Worm drive and wire wheels are, likewise, special Lanchester features, both now becoming standard practice of other makers.

**Application of the Worm Drive**—The Lanchester worm, however, is special in that the worm is hollow in the center, with the result that the area of contact between the worm and worm wheel is greatly increased. So far, only the Lanchester Company has been able to produce a machine to cut these worms, with the result that their cars are much more quiet and efficient than other makes fitted with worm drive of the standard type.

One make of car—the Deasy—uses worms and wheels purchased from the Lanchester Company. These Deasy cars have the Renault type of radiator, as also have the Arrol Johnston cars. The Renault bonnet and radiator are particularly adapted for use in conjunction with bodies of the torpedo or flush-sided type—a fact which is taken advantage of in the standard models of both makes. The radiator design was one of several Renault patents which were recently revoked in this country on the grounds of non-working, and hence many more cars are likely to abandon the usual type of radiator in its favor—for there is no doubt as to which type is the more popular with the buying public.

**The American Contingent**—Of American cars, the White, Ford, and Cadillac are the only makes represented, though the Mitchell would have been staged had space been available. As it is, this last car is on view at a nearby garage. The White is shown by Mr. F. Coleman in both the steam and petrol forms, and, judging from the interest which the latter aroused, it would seem likely to prove as popular as the steam car has been. The Ford is only shown in one model—the 20-horsepower—which sells at $950. The Cadillac, also, has a great reputation over here, particularly for its reliability. The 10-horsepower, single-cylinder has not been altered since the memorable standardization test of a year ago. The 20-30, four-cylinder model has dual ignition and a longer wheel-base than before. The Cadillac representative, F. S. Bennett, is well pleased with the business prospects for next season.

Two other makes might be described as semi-American. These are the Adams and the Bedford. The Adams is shown in the 10-horsepower form, with the single-cylinder horizontal engine, epicyclic gear, and single-chain drive, and also in the 16-horsepower and the 30-horsepower types, with four-cylinder engine in each case. Epicyclic gears are fitted as standard to these larger cars, but a sliding-gear type of gearbox will be supplied if required. The Bedford is really a British-built Buick. It is rated at 15-18 horsepower, four cylinders, and has a type of three-speed epicyclic gear known as the Norman, wherein the planetary pinions revolve only at slow speed. The rear springs are complete elliptic—a construction only followed on these and the Austin cars. The Bedford car carries a guarantee for three



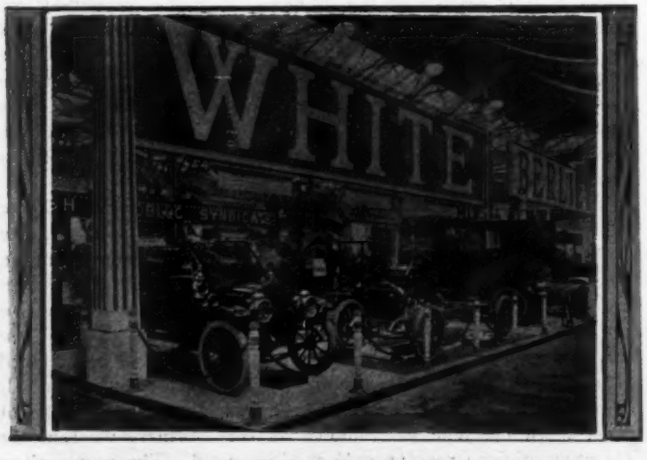

Ford Exemplified the American Light Car Ideas

years, the usual practice with other makers being to guarantee only for six months, or one year at most.

**Italy Turns to Moderate Prices**—In the medium power class there is an interesting group of Italian cars listed at moderate prices, consisting of Fiat, Itala, Lancia and Scat. The Fiat 12-14-horsepower has a bore and stroke of 80 x 120 mm, and the cylinders are cast in one piece, together with the base chamber. The magneto is high tension, and the carbureter a new type, with the jet chamber warmed by a water jacket. All the other parts of the car are standard, but the detail, finish, and general workmanship attract general attention. The Itala has the same bore and stroke, but is rated at 15 horsepower. It is almost exactly the same in appearance as the Fiat, save that it has no radius or torque rods. Its chassis price is $1,475. The Lancia 20-horsepower and the Scat 12-14-horsepower have no special details which call for comment except their general style and attractive appearance.

The British cars of this class which are most popular are the Crossley, Humber and Star. The first named, rated at 12-14 horsepower, has its four cylinders (size 80 x 120 mm) cast in one piece with the crankcase, while the gearbox has an extension which surrounds the flywheel and is bolted to the crankcase casting, thus giving the chassis a very neat appearance. The torque and radius rods are replaced by a steel tube, which surrounds the rear axle and terminates at the forward end in a spherical joint. The rear axle is so arranged that the propellor shaft and differential gearing can be removed without dismantling the axle. The car is fitted with internal expanding brakes on both front and rear wheels, and sells at $1,925 complete with five-seated body.

The 15-horsepower Star has come to the front lately on account of its high speeds—a standard type of two-seater having




White Showed the Gasoline Model beside the Steamer

been officially timed at Brooklands to cover a mile at the rate of 72 m.p.h. The engine has bore and stroke of 85 and 135 mm, and has a high compression and very large valves. The engine, clutch and gearbox form one unit, the latter providing four forward speeds with direct drive on the third.

As it was the Humber firm that first produced a popular four-cylinder car of moderate price, the Humber cars are always looked to as representative of British small car design. The only surprisingly novel feature is the adoption of four speeds instead of three on all models. This is rather contrary to the general tendency, but the designers stoutly maintain that if a small car is to give satisfaction for touring work it must be given such choice of gearing that all hills may be surmounted at a reasonably fast speed. On small cars the first, or emergency, speed is usually so low that it is hardly to be counted as a normal speed, and hence the car has but the second and top gears for ordinary work. When, as usual, only three speeds are fitted, the gap between second and top is too great to enable the car to do well in hilly country; hence the interposition of an extra speed between the two seems a reasonable proceeding. It will be interesting to see if other small car makers follow suit. Other Humber features are the use of thermo-syphon cooling and the provision of the Humber detachable wheels on all models, free of charge.

**Several Small Piston-Valve Cars**—In this medium power class there are three cars with piston-valve engines—the only apparent results of the experimenting which has been carried out on these lines by almost every maker. The three in question are the Hewitt, Bentall and Cooper. The 15-horsepower Hewitt engine has four cylinders cast in pairs, the bore and stroke being 90 x 108 mm. The eight piston valves are all placed on one side of the engine, and operate in long valve boxes placed alongside and at an angle with the main cylinders. These pistons are operated by connecting rods attached to the secondary shaft, and as they descend they uncover ports communicating with the carburetor and exhaust box respectively. The stroke of the valves is half that of the main pistons. The valves and ports are all water jacketed, and as the piston rings are never directly subjected to the heat of the burning gases, no lubrication troubles are experienced. An important fact is that the exhaust pistons travel downwards at maximum speed during the period of combustion, so that they are self driven and help to give power to the crankshaft. The inlet pistons are smaller in size and are so arranged that they are neutral as regards power. This engine has given excellent results on test, and when the system becomes better known the cars should become very popular.

The Bentall engine has likewise eight piston valves, but these are operated by rocker arms from an overhead shaft. The valve cylinders extend down the full length of the main cylinders, the inlet and exhaust sets being on opposite sides. These piston valves are hollow and are provided with ports about halfway in their length. When these ports register with ports cut in the cylinder walls the incoming or exhaust gases have free passage. As the ports will register on both down and up strokes of the valves it is only necessary to run the overhead shaft at one-fourth the engine speed, and hence the valve movement is correspondingly slower. The inlet and exhaust pipes are cast together with the cylinders, so that a very neat engine results. It might be expected that the hollow exhaust pistons would become excessively hot, but it is claimed that no trouble is apparent even after several hours' full load running.

The third new engine, the Cooper, is of the two-stroke type, having four cylinders, size 92 x 114 mm. Each cylinder has a piston rod and crosshead guide similar to those of a double-acting steam engine, and also a long piston valve, operated by a connecting rod from the half-speed shaft. Each crosshead is stationary, so that, as the working piston ascends, it draws the fresh charge through the piston valve into the space between itself and the crosshead. On the down stroke this charge is

compressed and finally transferred through the center of the piston valve to the combustion chamber, where it drives out the exhaust gases through a port on the opposite side. The Cooper car has also an interesting rear axle drive, giving two direct forward speeds. This is effected by having two crown wheels of different size continually in mesh with two bevel gears, one or other of the latter being engaged with the propellor shaft by means of a double-dog clutch. A geared low speed and a reverse are also provided.

**Many Single-Cylinder Cars**—The small power class mainly consists of four-cylinder and one-cylinder cars, for the two-cylinder engine does not seem to regain its former popularity. There is, as a matter of fact, one six-cylinder car in this low-powered category—the 10-horsepower Delaunay-Belleville. This little two-seater has not been changed in design since last year, and good reports have been made of its running. There are many cars with monobloc engines of 8 to 12 horsepower, such as the French Delage, De Dion and Berliet, the German Adler and Opel, the Belgian Imperial and Metallurgique, and a dozen British cars. A notable newcomer to the four-cylinder section is the Renault, with 8-horsepower engine of 70 mm bore by 110 stroke. All these cars have three-speed gearbox and propellor-shaft drive, with raked steering column and two-seated body.

The small car is now by no means the rough and incomplete vehicle of the style customary several years ago. In nearly every case the detail work has received as much attention as would be paid to the higher powered models. The reason for this is obvious, for all makers now look to the small and medium-sized car as the type for which the principal demand exists and recognize that this market is well worth securing.

Indicative of this fact is the small 7-horsepower car which the British firm of Austin has brought out. This has a single-cylinder engine of 105 x 127-mm bore and stroke and standard transmission, while all the parts, down to the gate change system and the internal expanding rear brakes, are exactly similar to those of the high-priced Austins. The price of this two-seater is $750 complete.

Other well-known single-cylinders are the Rover, Sizaire-Naudin and Jackson. The latter is curiously rated at 7-27 horsepower; the explanation being that the engine, 104-mm bore, is 7 horsepower by the R. A. C. formula, but on account of its stroke of 215 milimeters and high compression it develops 27 brake horsepower.

Fullest advantage is thus taken of the lessons of the French voiturette races and the Tourist Trophy. It will be interesting to note how the public receives this type of car, as its great power is gained principally at the expense of abnormally high piston speed. The engine has the further disadvantage of being very tall and awkward-looking. No one, however, has cast any doubt on its ability to develop its rated power. The general opinion is that such an extreme design will find little favor.

Handsome Building Occupied by the London Ford Branch

**As Usual, a Hydraulic Transmission**—Inventors have not yet abandoned the idea of the hydraulic transmission, which seems as fascinating as the various types of two-cycle and double-acting engines. The latest development in this line is the Torbina car, the vital part of which is illustrated elsewhere. The transmission device consists of a paddle-wheel with twin blades running in water; the blades can be deflected so as to displace a maximum or minimum quantity of liquid. In the maximum position the whole apparatus is automatically locked solid, and at the intermediate angles the slip is utilized to obtain the varying drives. The device is interesting principally as showing that the struggle for noveltes has not ceased.

Exterior of the "All-Motor" Fire Engine Station at Charleton Road, East Greenwich, England

Competing Vehicles in French Commercial Trials Leaving the Garage at the End of the Trials

# 31 COMPLETED FRENCH COMMERCIAL VEHICLE TRIALS

PARIS, Nov. 30—Thirty-one commercial automobiles of various types and powers have been put on the scales, verified, and dismissed with a diploma certifying that they have made twenty-four distinct daily journeys, covering a total distance varying from 1,500 to 2,300 miles on schedule time, have carried a certain load and have used a certain amount of gasoline, alcohol, benzol, and lubricating oil.

This year's French industrial vehicle trials were organized with more assistance from the army than is usual, for the government, after experimenting cautiously for a number of years, has decided to inaugurate a system of subsidies, under which the purchaser of an approved type of vehicle can receive $600 the first year and $200 for each of the three following years, on condition that he presents his automobile annually for inspection and hands it over in case of mobilization. The type to which these favors should be extended was to be decided upon during these trials.

Regularity of running and economy in the use of fuel were the basis on which the trials were held. They were more difficult than on any previous occasion, for, with a view to eliminating the weaklings, the army authorities insisted on the date being October 15 to November 15. It is a time of the year when roads are liable to be heavy, putting engines and transmission to a more severe test than in summer.

### Altogether Fifty-one Vehicles Started

At the start the competition united 51 vehicles. At the finish they were twenty-nine in the Automobile Club and army test, with two others that had entered under army conditions only. Two steamers which went through the preliminary formalities were withdrawn on the first day owing to the impossibility of arriving at an understanding on the fuel question. Two gasoline-electrics were withdrawn after the first day's run, owing to their obvious inability to compete on an economical basis with the gasoline products. There were two or three cases of gear failure causing withdrawal, and several of engine breakdown. In four or five cases, the mishaps were so slight that the competing vehicles were repaired and continued, though not given any official credit for doing so. Among these were two Berliet trucks, which on the first day ran into one another on a hill, owing to the brakes of the rearmost vehicle failing to hold. They were both repaired the same day and followed in the wake of the actual competitors, covering all the stages on schedule time. Officiallly, however, they were ignored.

The firms which figured best for team work were Saurer with five starts and five finishers in different classes, several of these being first prize winners. Delahaye with four starters and finishers; Bayard-Clement, also with four to start and finish; Aries with the same number, and Vinot-Deguingand with three out of three. De Dion Bouton lost two out of its four vehicles during the month; Peugeot lost two out of four, one of the two, however, continuing unofficially. Berliet also lost two out of four, the disqualified pair continuing without official recognition. Panhard-Levassor lost three out of four of its 15-horsepower trucks; Malicet & Blin had one failure out of three entrants, and Schneider lost both of its pair.

The reliability test was much more severe than is usual in competitions held by the French club. With the exception of the heaviest vehicles the average speed was fixed at 15 miles an hour, for daily runs varying from 60 to 120 miles. A maximum speed was also imposed, it being the duty of the military observer to see that it was not exceeded on any stage of the journey. If it were exceeded the vehicle had to be held back until the time limit had expired. Failure to make any one control on time meant disqualification.

### Three Kinds of Fuel Used in the Contest

Three different types of fuel had to be used. For the first thirteen days, ordinary gasoline was supplied, and for three days over different routes the consumption was officially controlled. For one week the vehicles had to use alcohol, with two of these days during which the consumption was noted. Finally benzol was imposed for five days, with two of them under official control as regards consumption. As a proof of the thorough manner in which the fuel problem has been studied, it is only necessary to state that there was not a single failure successfully to use alcohol and benzol with no other adjustments than were possible during running time. Naturally they were prepared for this, there being a number of interesting carbureter adjustments with a view to economy, but the engines themselves had to remain unchanged. The only difficulty experienced was in starting up.

Fuel economy was not quite so remarkable as during last year's test, the reason being the increased average speed imposed. Another point of interest in the trials was that instead of the economy test being held at the end of the run over a comparatively short distance, it was carried on on seven different days, and for a distance of roughly five hundred miles. Another innovation was that the consumption of lubricating oil was controlled from the commencement to the end of the run, that is to say, for a period of 24 days and over a distance of 2,000 miles.

### Horsepower Rating Was Not Excessive

With a view to figuring well on the economy basis the horsepower of the engines was kept as low as possible. In the class carrying loads not exceeding three tons, the rating of the engines varied from 14 to 22. Notable in this class were two Delahaye trucks with two-cylinder engines rated at 15-horsepower and having a bore of 3.9 inches and a stroke of 7.08 inches. Long stroke motors were in the majority, and further showed their superiority over the short strokes by winning in nearly all the classes. In section 5, for vehicles carrying more than a three ton load, two Delahaye trucks with four cylinder engines of 3 1-2 by 6 1-5 inches bore and stroke won respectively first and second prizes. On the official trials the two-cylinder Delahaye, carrying a useful load of almost three tons, would cover twelve miles to a gallon of gasoline. The four cylinder of the same make averaged 10 1-2 miles to the gallon with a load of 3 1-2 tons and a total weight of 6 tons.

The competing vehicles were divided into eight distinct classes, the first one being occupied entirely by a small two-cylinder Bayard-Clement delivery van which naturally won first prize. The second section, for delivery vans carrying a useful load varying from 1,324 to 2,645 pounds, was entered by De Dion Bouton and Vinot-Deguingand. The De Dion Bouton, a one lunger of 9-horsepower, broke down during the trials, leaving the four-cylinder Vinot-Deguingand the victor. In the third section there were only three entries, all of which went through to the end, Saurer getting first prize, Bayard-Clement second and Delaugere-Clayette third.

### Saurer Figured Most Prominently

There was keen competition in the fourth class, where loads of 4,400 to 6,600 pounds were imposed. Here Saurer got first and third prizes, the two-cylinder Delahaye second and fifth and Vinot-Deguingand fourth and sixth. The others in order were De Dion Bouton, Aries, Panhard, Malicet & Blin, and Cohendet. The fifth section, imposing loads of more than three tons was, with the fourth, one in which the army was interested, and drew forth a strong set of competitors. Delahaye took first and second prizes, De Dion Bouton third and fourth, Aries fifth and sixth, and Malicet & Blin seventh. Whereas in the fourth class solid rubber tires had been carried almost without an exception, in the fifth section, having loads running as high as five tons, there were several cases of steel shod bandages all round and more in which rubber was used in front only.

The road trains and omnibus classes were not well filled. Saurer was the only one in the tractor class, his tractor having a load of four tons and his trailer one of three tons, pulled by an engine of only 4 by 6 inches stroke. The small bus class, having seats for 6 to 8 persons, was won by Bayard-Clement, with the same firm second and Peugeot third. Saurer was the only entrant in the large bus class, and was declared the winner.

The military section of the jury was more than usually afraid of cheating. When the competition had been brought to a close and final weighing in carried through, this operation comprising four separate weighings, with load, without load, with body and without body, the mechanical organs were tested. Every gasoline tank was sawn open in order to allow an officer to pass an electric lamp inside and examine thoroughly. One car had to have its differential entirely dismounted, another had to take its gearbox entirely to pieces, still another had to do the same with its steering gear, the same was done with a magneto, and even one of the solid tires of a Saurer truck was ordered to be cut off the rim. Evidently the military authorities had no intention of giving their award to a vehicle that had finished the test in a shaky condition or that had made use of any unauthorized methods.

De Dion Experimented with an Aluminum Bound Wheel

### Latest Type of French Taxicab

PARIS, Nov. 30—A new type of taxicab is about to be put on the streets of Paris which has a certain general appearance to the electrics formerly employed by the New York Transportation Company. The resemblance, however, is only confined to the position of the driver, who, on the Roval taxicabs is at the back and slightly higher than the top of his cab. Although this is the first time a taxicab of this style has been produced, the idea is not new, this type of chassis having been used for light delivery work for about two years. The feature is that the power plant is above or behind the rear axle. It consists of a single cylinder De Dion Bouton engine rated at 9-horsepower, a very compact three speed transmission, and final drive by side chains.

The frame is special, being of pressed steel with a considerable drop to give a low side entrance, and having the driver's platform stamped out with the side members. The closed body is not only larger than can be fitted to the standard type of taxicab, but it is better suspended by reason of its position midway between the two axles. The front portion, usually occupied by the engine, serves as a platform for the carrying of luggage. The disadvantage of the driver's position appears to be the very complicated and indirect steering linkage made necessary.

The company having taken over this venture has decided to put the cabs into circulation at the same rate of fares as are charged by the horse cab drivers, the initial rate being 15 cents for a distance of practically 1,400 yards. After this distance has been covered the succeeding miles are at a much lower rate.

Roval Taxicab Is an Entirely New Type in Paris

# FRENCH SMALL CAR RELIABILITY TRIALS NEXT IN ORDER

PARIS, Nov. 23—Twenty-seven small cars are entered for the first Reliability Trials to be held in France. The small vehicles are to cover fifteen daily stages of 125 miles each at an average speed of 15½ miles an hour without any stoppages other than for tightening nuts, adjusting brakes and driving chains, taking on oil, water and gasoline, cleaning spark plugs or carbureter in case of obstruction, and changing tires. Although these do not count as penalizations, they must be noted by the observers, and will serve to divide the competitors in case of a tie from which a winner cannot otherwise be evolved.

The organizers are convinced that regularity alone will be sufficient to weed out the weaklings, especially as the event has to be run in mid-winter over roads that are never good and are sometimes decidedly bad. The central station will be some garage in Paris, from which the competitors will be sent out each morning to cover one of six courses prepared in advance, but which will not be announced until a few minutes before the start.

By keeping the route to be travelled over in the dark until the hour of starting, it is believed that the possibility of fraud will be altogether eliminated. An observer supplied by a rival firm will be carried on each car, and the technical portion of the test will be under the control of Gustave Caillois, once a Vanderbilt race driver, with Thomas, Paul Meyan, a sporting journalist, and Eugene Renaux, the winner of the Coupe de la Presse.

The cars entered in the Reliability Trials are supplied by the voiturette specialists of France, comprising three each from Sizaire & Naudin, Gregoire, Delage, Barre de Niort, Doriot-Flandrin, Corre La Licorne, Turicum, and Alcyon, and one each from Hurtu, Fouillaron and Zenith. The definition of a small car is one with a single-cylinder engine of not more than 4 9-10 bore by 5 9-10 inches stroke; 3 9-10 by 5 1-10 for two cylinders, and 3 1-10 by 4 7-10 for four cylinders. They must be in every respect according to current catalogue, and completely fitted for touring with mudguards, running boards, hood, windshield and lanterns.

Single-cylinder cars will be slightly in the majority, followed closely by small fours, with a sprinkling of twos. It is not likely that the maximum dimensions allowed under the rules will be taken advantage of, the majority of small cars on the market having engines with slightly less bore and stroke than those allowed. Nothing is to be gained by having the largest possible engine, for no account will be taken of any speeds above 15 1-2 miles an hour average for the entire distance.

# LOOKS DOUBTFUL IF FRENCH GRAND PRIX WILL BE HELD

PARIS, Nov. 24—Nine entries have been received towards the 45 necessary before the Automobile Club of France will hold a Grand Prix. As there are less than two weeks in which to obtain the remaining 36, the prospects of the race would appear to be doubtful. The firms already entered are De Dion Bouton, Benz and Rolland-Pilain. The minimum figure is unnecessarily high, for only once has this number of starters been obtained for an international race held in France.

On the Auvergne course in 1905 there were only 29 starters; on the Sarthe in 1906 the number was 34; at Dieppe in 1907 it was 38, and in the following year at the same place it reached the record of 49. Last year, when nobody wanted to race, the number of starters had to be 40; now that there is a certain feeling in favor of a speed event the number has to be 45 before the club will move.

If the Automobile Club of France is rather cold hearted over the prospects of an automobile race, the same does not apply to the Dieppe district. The mayor of the town and the deputy of the district have just paid a visit to the racing board in order to promise a subsidy of $20,000 if the race is held on the triangular course by the seashore. In addition, they will undertake to put the roads in racing trim at an additional cost of about $15,000.

Should an aeroplane race be added to the automobile speed test, the district will come forward with a subsidy of $40,000 in addition to all local assistance for organizing these events.

In a moment of enthusiasm the Club proposed to have two days' automobile racing at Dieppe, two days on which motor boats would show their speed ability in the bay, and two or three days for aeroplane races over a prepared aerodrome, then as a grand final a flight of all the artificial birds across the English Channel to the British shore, a stay there of about half an hour in order to replenish the gasoline and oil supply, and return to the starting point.

The scheme is the most ambitious one ever conceived by the Club. But it was no sooner conceived than they seemed to become afraid of it, as is shown by the fixing of 45 cars as the minimum for the Grand Prix, and the declaration that the aeroplane race will only be held if the automobile event can be carried through. Dieppe, however, is so enthusiastic over the matter that she is capable of carrying all or a portion of the program through without the aid of the club.

Negotiations have already been commenced with Brighton, on the opposite side of the Channel, in order to endeavor to put up a big prize for flights over the sea if the Automobile Club backs out of the affair.

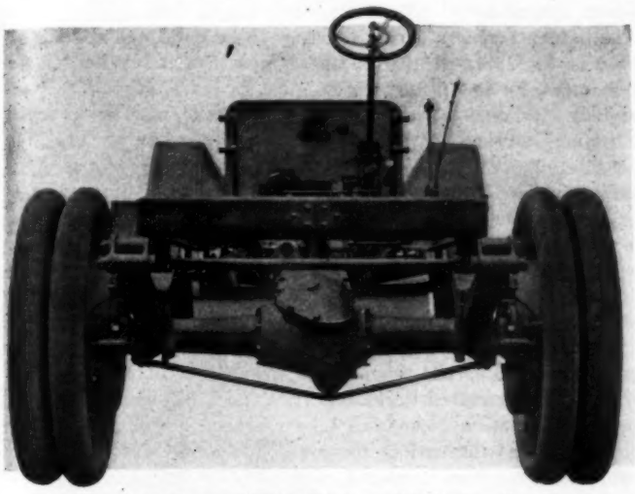
PARIS, Nov. 30—The lists for the proposed revival of the Grand Prix of the Automobile Club of France closed to-day. Insufficient entries were received, and this will mean the abandonment of the race in 1910, unless the club can be persuaded to change its mind.

# BUSSING PRINCIPAL WINNER IN AUSTRIAN TRIALS

VIENNA, Nov. 24—Austria's commercial car trials, October 3 to 17, the results of which have just been published, were a great success, as of the fourteen vehicles that started out on the 1,100 kilometers tour, all fourteen returned to Vienna. The judges' awards are somewhat of a triumph for the German industry, as the Büssing cars of Brunswick carried off the chief trophies. The prize of the Ministry of Commerce for the vehicle with the best daily result, went to the Büssing bus, which also received the prize of the Minister of Public Works for the best omnibus. The trophy given by the same department was awarded to the Büssing road-train, which took the gold medal of the Austrian A. C. as well. Two prizes of the Ministry of War went to the Daimler road-train, and the silver medals were awarded to the Büssing bus, Daimler bus, Fiat delivery van, Büssing van, Mulay van, and Büssing trailer, for the best results in the different categories; while all the competitors received diplomas for having ended the journey successfully. The Büssing victory was analogous to that of Saurer in France.

# AND NOW A WHITE ONE AND A HALF TON GASOLINE TRUCK

WIDESPREAD interest of late concentrated on the commercial vehicle situation and the existing types of cars, has resulted in several newcomers in that field. Of these, none will excite more surprise than the announcement that the White Company will produce a gasoline-driven truck of 1 1-2 tons nominal capacity. Surprise because this concern has but recently



Rear Construction and Twin Tires on White Gasoline Truck

entered the gasoline field, and admiration at the details of the car as turned out, will be intermingled equally.

As the two illustrations on this page show, the conventional lines are followed, the motor being located in front under a hood, driving through a clutch to a transmission in a mid-location, and from there back to the rear wheels by shaft and bevel gears.

In the motor will be noticed a radical departure from the conventional, however, as the block engine of the pleasure car is used. In this the White Company will be one of, if not the first, to use a block motor of four cylinders for commercial purposes.

In detail the engine used in the truck is the standard White gasoline engine with a bore of 3 3-4 inches and a stroke of 5 1-8 inches. The intake and exhaust passages form an integral part of the engine casting. The valve stems and valve springs are completely enclosed. The clutch is of the leather-faced cone type; the transmission has four forward speeds, and the drive from gearcase to rear axle is by means of a shaft. Both the engine and the gearcase are supported in the frame by three-point suspension.

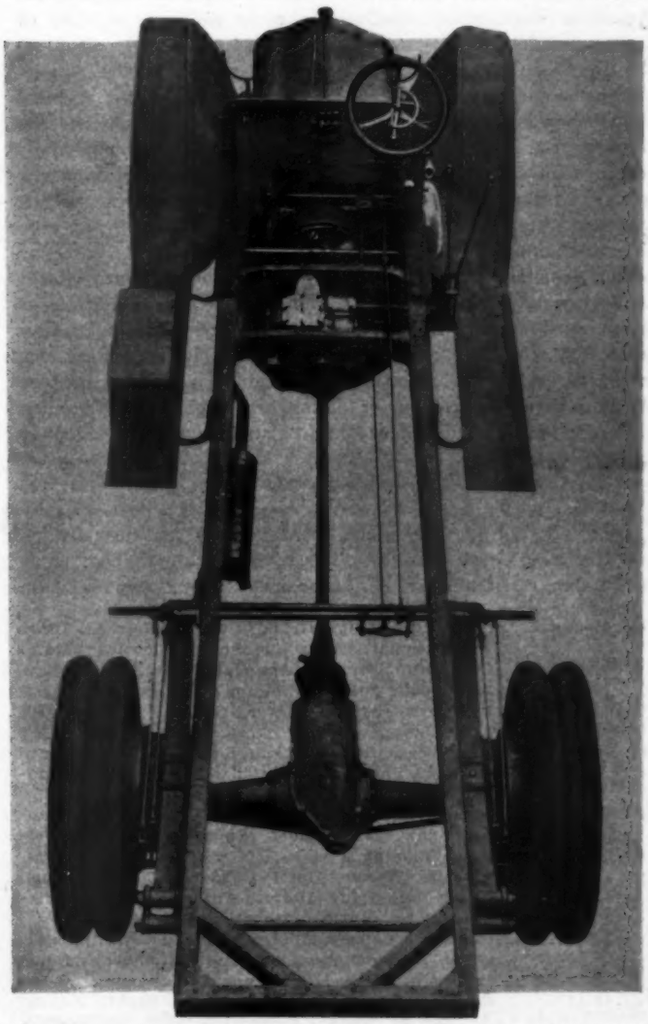
In accordance with recent foreign practice, the truck is fitted with pneumatic tires, each rear wheel being fitted with two 36 by 4 tires. The rear axle is so located that when the truck is loaded practically all of the load is supported by the rear wheels, so that steering is rendered very easy. The wheel base is 144 inches, the ratio between the rate of revolution of the engine and of the rear wheels on the direct drive is 7 to 1. The accompanying illustration of the rear construction shows the liberal dimensions of the brake-drums and the unusually substantial construction of the rear axle, springs, etc.

In particular, the differential housing will be noticed. This is a very neat construction, and withal, a very accessible one. There are but three parts, the two tapering axle sleeves and the gear housing proper. The sleeves are bolted up to the housing by means of integral flanges, while the gears may be reached or seen, for the various purposes of inspection, oiling, repairs, etc., by removing the cover. The latter is held in place by nine bolts, so that its removal is a matter of but a minute's work.

Two sets of brakes are fitted, following touring car practice. These are both located on the rear hubs, and are operated in the usual manner, one by foot pedal and the other by hand lever at the side. The clutch pedal, when pressed clear forward, will pick up the emergency brakes also.

On the order of touring car practice, too, is the frame. This is of pressed steel, of channel section with the open side turned in, so as to present a smooth exterior. The thickness of metal is, however, very considerable, while the bracing at the rear end, where the strains of a truck body would be greatest, is unusually stiff. Not only are the usual gusset plates provided at top and bottom, but a second diagonal bracing is added. This takes the form of a channel of slightly lessened height, bent to a trough shape in the middle of its length. This central part is riveted to the back member of the frame by six stout rivets, while the end portions are flattened to go inside of the side members, where they are riveted in place. In addition to this, the spring support takes the form of a continuous bar, which extends from the outside of one spring eye across the car to the outside of the other spring eye. This at the front and rear of the back springs, which are semi elliptic in shape, strengthens the rear portion of the chassis very materially.

Considering the weight of load in relation to the possible speed, 3,000 pounds moving at not over 16 miles per hour, in comparison with touring car practice, 800 pounds load moving at speeds up to and beyond 40 miles per hour, the use of pneumatic tires is seen to be very reasonably sure of success.



White Chassis From Above, Showing Simplicity of Rear Axle

# THINGS RUSSELL HUFF OBSERVED ABROAD

PARIS, Nov. 26—"There is very little that is radically new on the European automobile market," said Russell Huff, chief engineer of the Packard Motor Car Company, to THE AUTOMOBILE representative. Mr. Huff had paid a hurried trip to Europe primarily to visit the London automobile show, and at the same time to look into the European field generally. After a few days in London he made a run of the French factories, slipped over to Belgium, and will sail for New York on the *Lusitania*.

"All the tendency is towards small four-cylinder low-powered cars. The European makers have stopped building large cars altogether. Simplification is being pushed to a very fine degree, the parts being reduced as low as possible in order to make the car cheap to produce in the first case and easy to maintain when in the hands of the private owner. The chain-driven car has almost gone out of business. In England there is a strong tendency towards worm drive, in place of bevel gear. I particularly noticed that there is no boom in six-cylinder cars. I made a list of all the firms having formerly made six-cylinder cars in rather important numbers, and who did not show them this year. There were seven or eight firms who have abandoned the six.

"On the other hand, every firm of importance has brought out a small four-cylinder car, of about 12 to 20 horsepower, and in each case this small model is made the leading line. Where sixes are still shown they are very small engines, as the Delaunay-Belleville and the new Renault. Taking an average, the American engineering standard is quite as high as that of Europe, while in the matter of steels we have got far ahead of the European constructor.

"Business seemed to be good at the London show, and the Britisher was doubtless helped enormously by the absence for the first time of the rival show in Paris. This enabled him to secure a lot of outside contracts that he would never otherwise have got. Both in France and England the commercial vehicle business seems promising. All kinds of firms having any considerable amount of haulage to do have changed from horses to power vehicles. Taxicabs and motor omnibuses have put the horse variety entirely out of business. The European taxicab is a very light vehicle, generally with two cylinders in London, and often with only one cylinder in Paris. It is declared that owing to keen competition not much money is being earned by the London taxicab companies, although the vehicles are popular.

"There is a strong tendency in England towards the adoption of what is known as the torpedo type of automobile body. It is straight-line body, with as little resistance as possible combined with maximum protection against the wind. The cars have high side doors for both front and rear seats, while the seats are set very low to give the passengers full protection. Wire wheels, of the dismountable type, are also a popular feature in England.

"Although business generally seems to be good, the volume of trade is far short of that in the United States. Whereas we at home will doubtless turn out 200,000 cars next year, the estimated product of the combined English factories is only 12,000 cars. When the European buys a car it is generally kept for a number of years. There are scores of cars doing good service in Paris which came out of the factory six or seven years ago. They have had their body work changed from time to time, and often carry closed limousines, and they have been freshly painted when they needed it. Nevertheless, they are old-fashioned models that the American automobilist would be ashamed to drive.

"European touring is as popular as ever among Americans. As an indication, our own Paris branch has been in touch with over two hundred Packard parties during the present season. The transportation companies take care of the automobiles so thoroughly, and the various touring bodies have so simplified the formalities that there is nothing difficult about an automobile trip through Europe. There is a charm about foreign travel that appeals to our people, and will certainly cause them to visit Europe every year in increasing numbers. There are good roads, historic interest, fine scenery, architecture and quaint customs that cannot be seen at home.

"One point of interest to the American visitor is the comparatively small life got out of tires on the hard macadam roads of Europe. I was told in England that 2,500 miles out of a steel-studded non-skid tire was considered very satisfactory service. Being very hard and dust proof, the wear is naturally very much greater than on our softer American roads.

"There does not appear to be much possibility of business with Europe for other than the makers of cheap, popular cars. The market is so small that none of the first-class makers are likely to bother with it. Quite a number of American cars are sold in England, and appear to sell well. Practically none are sold in France. In every case those who have got the business are makers of the cheaper moderate-power cars."

# THE AUTOMOBILE CALENDAR

Dec. 25-Jan. 1....Columbus, O., Automobile Show, Columbus Automobile Club.

Dec. 31-Jan. 7....New York City, Grand Central Palace, Tenth International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.

Jan. 8-15.....New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.

Jan. 17-22.....Philadelphia, Second Regiment Armory, Automobile Show. J. H. Beck, Secretary, 216 Odd Fellows' Building.

Jan. 24-29.....Detroit, Wayne Hotel Gardens, Third Annual Automobile Show, Detroit Auto Dealers' Association. John Gillispie, Manager, Hotel Tuller.

Feb. 5-12.....Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.

Feb. 14-19.....Buffalo, N. Y., Broadway Arsenal, Eighth Annual Automobile Show, Automobile Club of Buffalo. Dal H. Lewis, Manager, 760 Main Street.

Feb. 19-26.....Newark, N. J., Essex Troop Armory, Automobile Show, New Jersey Exhibition Company.

Feb. 19-26.....Salt Lake City Auditorium, Automobile Show, Utah Automobile Dealers' Association. W. D. Rishel, Manager, 1-5 East First South Street.

Feb. 21-26.....Cincinnati, Music Hall, Automobile Show, Automobile Club of Cincinnati. Jesse Lippencott, Chairman Exhibits Committee, Gibson House.

Feb. 22-26.....Kansas City, Mo., Convention Hall, Fouth Annual Automobile Show.

Feb. 22-27.....Milwaukee, Wis., Auditorium, Second Annual Automobile Show, Milwaukee Automobile Club.

Feb. 24-26.....Binghamton, N. Y., State Armory, Automobile Show. R. W. Whipple, Secretary.

Feb. 24-Mar. 3....Toronto, St. Lawrence Arena., Canadian Automobile Show, Ontario Motor League. E. M. Wilcox, Secretary.

March 5-12.....Boston, Mechanics' Building, Eighth Annual Automobile Show, Boston Automobile Dealers' Association. Chester I. Campbell, General Manager, 5 Park Square.

March 12-19.....Syracuse, N. Y., State Armory, Automobile Show, Syracuse Automobile Dealers' Association.

# WHAT GENERAL MOTORS WILL DO IN DETROIT

DETROIT, Nov. 28—Some day some ambitious chronicler of facts stranger than fiction is going to write the romance of the automobile industry. When he does a little space might profitably be devoted to telling how Detroit finally came into its own, thereby adding another bit of testimony in support of the frayed old adage that all things come to those who wait.

Among those who hailed with acclaim the announcement that the General Motors Company would establish a central plant here, which will be the largest automobile manufactory in the world, few were familiar with a bit of hitherto unwritten history that at this stage of the proceedings makes decidedly interesting reading, although to loyal Detroiters the admission of early error of judgment may be a bit humiliating.

W. C. Durant, of General Motors

Six years ago David D. Buick was building gasoline engines in a little shop out on the west side of the city. He believed the automobile, then in an experimental stage, was facing a great future and decided to get in on the ground floor. He started out to organize an automobile company, but never got past the starting point so far as Detroit capital was concerned. Local men of means were not looking for investments in such hair-brained enterprises as this.

Perhaps their indifference was not strange. In those days they held automobile "races" on the old Grosse Pointe track, and thousands flocked there to witness the antics of the speed merchants with their "benzine buggies" and snail-like electrics that often expired before they succeeded in circling the mile track, and went away with serious doubts as to whether such an unreliable device as an automobile could ever be made practical.

Buick worked in his shop days and spent his nights trying to interest capital, being met with rebuffs on every hand. A few thousand dollars was all he required, and he had enough business in sight to cover the capital he was seeking several times over. About this time Flint, Mich., already famous as the Vehicle City of America, was casting about for new fields to conquer, and thither Buick went, shaking the dust of Detroit from his feet. The Buick Motor Company was organized, and a comfortable business soon established. Then W. C. Durant, who had made a fortune as a manufacturer of carriages and wagons, decided to enter the automobile field, and acquired an interest in the Buick Motor Company. The indefatigable energy and executive ability that had gained for him independence in one line immediately manifested itself in the new field, with the result that the automobile business grew by leaps and bounds. The history of the Buick Motor Company, and how in Mr. Durant's hands it furnished a nucleus for the General Motors Company, is all of such recent date that there is no use reviewing it.

What the Buick Motor Company might have amounted to had Detroiters interested themselves in the enterprise six years ago will never be known. Certainly similar concerns that followed on have exceeded the fondest expectations. However, the point of interest at this time is that without the Buick Motor Company there would probably have been no General Motors Company, and without the General Motors Company there would have been no central plant representing an investment of $2,500,000, and furnishing employment for from five to seven thousand men. It may be a long way around, but there is a certain degree of comfort to Detroiters in knowing that, chiefly because a proposition was turned down cold six years ago, the city's indisputable position as the hub of automobile industry is to be immeasurably strengthened by the addition of the largest plant of its kind in existence.

Details of the central plant for the General Motors Company, whose location in Detroit was announced exclusively in last week's AUTOMOBILE, have been made public, and are on an even more comprehensive scale than was anticipated. Fifty acres of ground has been secured in the northeastern part of the city, and here fourteen mammoth buildings having a total floor space in excess of one hundred acres will be erected. These include, according to the plans prepared:

One administration building, three stories, 90 feet by 296 feet.
One central machine building, with two wings, 90 feet by 256 feet, three stories.
One central pavilion, three stories, 90 feet by 436 feet.
One "saw tooth" section, one story, 206 feet by 256 feet.
One assembling plant, three stories, 90 feet by 1,096 feet.
Two assembling plants, three stories, 90 feet by 700 feet each.
One warehouse, two stories, 263 feet by 290 feet.
One wood shop, three stories, 90 feet by 290 feet.
One wood shop, three stories, 90 feet by 256 feet.
One wood shop, one story, 300 feet by 256 feet.
One paint shop, three stories, 90 feet by 550 feet.
One foundry, one story with monitor roof, 180 feet by 780 feet.
One power house, one story, 90 feet by 150 feet.

In addition there will be many smaller buildings, such as shipping sheds, plant offices, etc. All will be of fireproof construction, and embody the most approved ideas.

The site, which alone cost $300,000, is ideal, extending as it does for several blocks along the railroad, with sidetrack facilities.

At present there are some thirty-five structures of various kinds on the property. These will be torn down or moved as rapidly as possible, and work on the plant proper will begin early in the spring. It is the present intention to have everything in shape for the season of 1911.

Speculation has been rife since the first announcement of the new plant was made as to what effect it would have on the future of other holdings of the General Motors Company. While not caring to go into details at this time further than to state that the new plant will be devoted to the production of a general line of automobiles and parts, those back of the undertaking announce that it will in no way affect the other plants, further than, where deemed necessary, to relieve them of some of their burdens.

Heretofore the General Motors Company has confined its activities to the purchase of interests in other plants. It now holds the immense Cadillac plant in Detroit, the Buick at Flint, one of the largest in the country; Welch, Cartercar, Oakland, and Rapid, at Pontiac; and several others scattered about Michigan, as well as numerous accessory plants. Now it has taken the greatest forward step in its career, and the outcome is of the utmost significance to Detroit and the trade in general.

## LEXINGTON SOON WILL BE A HOOSIER

LEXINGTON, KY., Nov. 29—The Lexington Motor Car Company has its fine new brick plant at Connersville, Ind., well under way, the first story being nearly completed. With good building weather such as is the rule at present, the middle of January will see the company comfortably installed. The Lexington plant is to be disposed of at a reasonable figure. The Commercial Club of Connersville has given a liberal bonus in return for the transplanting of the business to that city, and this, together with the footing gained during the past season, should establish the Lexington more firmly than ever both with customers and agents. The company expects to build 400 cars this season, and, like most others in the industry, has its total output already contracted for.

# A. A. A. IN ANNUAL MEETING RE-ELECTS PRESIDENT SPEARE

NEW YORK, Dec 1—Placing itself strongly upon record as being unequivocally opposed to reckless and unfair use of the highways by inconsiderate operators of automobiles, the annual meeting of the A. A. A. to-day re-elected Lewis R. Speare to its presidency, expressing unanimous approval of his occupancy of the office during the unexpired portion of the term of William H. Hotchkiss, who resigned to become superintendent of insurance of New York State. This is the official list for the ensuing year:

President, Lewis R. Speare, Massachusetts.
First Vice-President, Robert P. Hooper, Pennsylvania.
Second Vice-President, Frank M. Joyce, Minnesota.
Third Vice-President, F. C. Donald, Illinois.
Treasurer, H. A. Bonnell, New Jersey.
Secretary, Frederick H. Elliott, New York.
Chairman of the Executive Committee—A. G. Batchelder.
Chairman of the Legislative Committee—Charles Thaddeus Terry.
Chairman of the Touring Information Board—Powell Evans.
Chairman of the Contest Board—S. M. Butler.
Chairman of the Good Roads Committee—George C. Diehl.

ADDITIONAL EXECUTIVE COMMITTEE MEMBERS

| | | |
|---|---|---|
| S. A. Miles | Edwin S. George | William R. Innis |
| H. O. Smith | Paul C. Wolf | A. D. Converse |
| Alfred Reeves | Frank G. Webb | A. E. Lerch |
| W. E. Metzger | J. P. Coglin | G. W. Allen |
| C. H. Gillette | H. M. Rowe | A. E. Coffin |
| James T. Drought | F. C. Battey | A. H. Knoll |
| John Bancroft | J. H. Edwards | |
| Oliver A. Quayle | Louis W. Hill | |

On the first day of the meeting, the opening item was the dissolution of the old stockholding corporation under the New Jersey law, and the substitution of a more flexible charter under the Connecticut statute. The report of Chairman Terry was accepted in its entirety, and the necessary papers were signed by all the directors present at the meeting.

Reports of the various boards indicated that the work of the association has prospered substantially in the past twelvemonth, and the association is in a generally prosperous condition.

Chairman George C. Diehl of the Good Roads board referred to the successful Cleveland convention, and predicted something even more epochal at St. Louis next year.

Chairman Terry of the Legislative board presented a very exhaustive report and outlined the general plan that has been proposed for the First National Legislative convention which will be held in Washington, D. C., next February. At that time the National Registration bill will be re-introduced into Congress and it is expected that a public hearing on the measure will be secured during the week of the convention. The Uniform State motor vehicle law will also be brought prominently before the members and efforts will be made to secure its introduction into the legislature of those States which either possess no effective laws or those which in certain instances have been shown to be unreasonable in their provisions.

Chairman F. B. Hower, of the Contest board, told of the season's contests and indicated unmistakably that he did not desire a reappointment. In recognition of his indefatigable activities, a unanimous resolution of thanks was passed.

Chairman Powell Evans, of the Touring Information board, told of what had been accomplished in this direction and what was being outlined for the future.

Treasurer H. A. Bonnell's report gave a balance of over $12,000 in the treasury.

Secretary F. H. Elliott's figures placed the present membership at 25,759, represented in 30 State associations and 225 clubs. Six new State bodies have been formed during the past year.

Though President Speare, in his report, had referred to the inconsiderate use of the roads by the few, the following resolution, introduced by O. A. Quayle, chairman of the New York State Association legislative committee, was unanimously passed:

"Resolved, That the American Automobile Association places itself upon record as being unalterably opposed to the unfair use of the highways by criminal and lawless operators of motor-driven vehicles, and, furthermore, this national organization of automobile owners calls upon its various State associations to propose and secure the passage of laws which shall rid the highways of reckless and inconsiderate drivers even to the extent of revocation of licenses and jail penalties in proportion to the nature of the offences."

Among the recommendations of President Speare, was one concerning the disposition of the Glidden trophy, which will probably never be competed for again. The consensus of opinion is that the 1910 tour shall be known as the A. A. A. National Endurance Run, with rules so strenuous in character as to prove the undoubted reliability of the contestants, but minus a conclusion which shall positively require a single prize-winner.

It was decided that hereafter the fee for individual members shall be $5, the former price having been $3.

The association's offices will be continued at 437 Fifth avenue, at least for the next two years.

Due recognition was given of the assistance rendered by the National Association of Automobile Manufacturers, in the carrying on of the work of the national organization.

Powell Evans, of the Automobile Club of Philadelphia, desired that the association consider the possibility of extending its activities into the field of aeronautics, which, in its developments, he said, bade fair to be a kindred pastime to automobiling. This was referred to a special committee of which Mr. Evans was made chairman.

The nominating committee, of which J. P. Coghlin of Massachusetts was chairman, made its report at the Wednesday session, and no opposition candidates were placed in nomination.

## N. A. A. M. DECEMBER MONTHLY MEETING

It was natural that Chicago show matters should occupy most of the attention of the executive committee of the National Association of Automobile Manufacturers at its monthly meeting held at 7 East Forty-second street Wednesday afternoon. Because of the presence in the city of many members at the meetings of the A. L. A. M. and the A. M. C. M. A., the attendance was much larger than usual.

## A. M. C. M. A. HOLDS SPECIAL SESSION

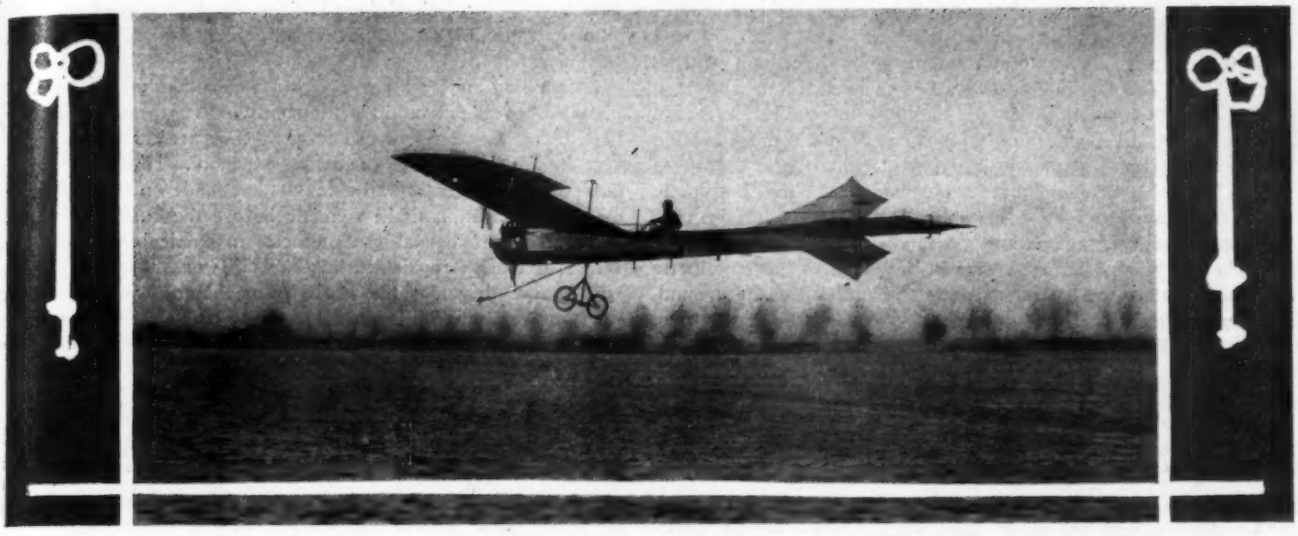
The Committee of Management of the American Motor Car Manufacturers' Association, with Chairman H. O. Smith presiding, held a session Tuesday at the association's headquarters, Fifth avenue and Forty-second street, its time being principally occupied with Grand Central Palace show arrangements. It is also understood that the Selden patent came in for some attention.

## A. L. A. M. HOLDS BUSINESS SESSIONS

At its headquarters on East Forty-second street, the Association of Licensed Automobile Manufacturers, Tuesday, held a meeting of all members, with a most generous attendance. President Charles Clifton occupied the chair, as he did at the meeting of the executive committee on Wednesday. No information was forthcoming at the time of going to press, though it was intimated that all the members of the A. M. C. M. A. had been given opportunity to obtain licenses upon reasonable terms.

## WRIGHTS ARRANGE DETAILS OF CO.

The officers of the $1,000,000 Wright aeroplane syndicate held a meeting Saturday at the office of Nicoll, Anable, Lindsay & Fuller, 31 Nassau street, New York, at which further details of the organization were perfected. After the meeting the brothers left for Dayton, O.



Küller Flying on an Antoinette Monoplane at Chalons Camp, in the Vicinity of Paris

# AEROPLANE SCHOOLS ESTABLISHED IN FRANCE

PARIS, Nov. 30—When the early automobile constructor sold a car to a customer there was not much occasion for him to trouble about the experience or otherwise of his client. The early aeroplane constructor has quite a different problem to deal with, for as soon as his customer has taken delivery of his machine he asks to be taught to fly. Hence the school.

When Henry Farman broke away from the Voisin Brothers he pitched on the military camp at Mourmelon, near Chalons, as the future scene of his activities. A vast plain two hours from Paris by rail, but so far removed from villages as to be beyond the reach of crowds, was loaned to him by the military authorities. Adjoining land was bought, workshops were erected, and the first aeroplane school was established in the champagne land. The Antoinette people were next attracted by this magnificent plain, with its surfaces like a lawn; the Voisin people followed.

Within twelve months one factory has been erected and four aeronautical schools brought into existence. The factory belongs to Henry Farman. It consists of four huge wooden sheds, capable of holding a dozen aeroplanes, complete with workshops, offices, sleeping rooms, etc. It is here that all the Farman biplanes are partially built and entirely assembled. The rapid growth of business makes it impossible to build entirely in the shops, and until enlargements can be made much of the wood has to be worked outside and assembled at the Mourmelon factory. The engines are built at the Gnome factory, near Paris, sent to Mourmelon after having been tested, and fitted to the aeroplane. When the machine is ready all that is necessary is to push it out of doors, start the engine and test it over the plain that spreads out for two or three miles.

Farman trains pupils in addition to building flyers. At present he has under his charge, among others, Van den Born, a well-known racing cyclist, and Sir Henry Rawlinson, a retired automobile dealer who was for many years connected with Darracq, and who has fitted his first flyer with a 120-horsepower Darracq motor that formerly did service on a racing car. Farman's method of training is first to test the machine alone, then mount with the pupil behind him. After an hour or two spent in skimming over the ground, the pupil has generally picked up a sufficient notion of the manner in which the levers are worked.

Mme. Delaroche, First Lady to Fly Alone

The Voisin and Antoinette companies undertake the training of pupils only, their respective factories being in the neighborhood of Paris. Edouard Chateau, the Voisin instructor, has about a dozen pupils, among them being the English sportsman, the Duke of Westminster, and Madame Delaroche, a young Frenchwoman who is proud of the title of the first lady to fly.

**Pupils Ride in the "Taxi"**—There is a special aeroplane, known as the "taxi," on which pupils are taught to fly. Its power is low, and its planes so adjusted that it can only be got off the ground with a certain amount of difficulty. For the first lesson Instructor Chateau mounts with the pupil by his side, and while alternately running over the ground and flying through the air explains the movements to his pupils. Then comes the first flight alone. Starting from the door of the shed, the machine runs up the rising ground without being able to rise into the air. Then the top of the slope is reached, and the downward run commenced. If the aeroplane is handled properly it will fly over the descending ground without any particular effort of the pilot. After covering about a mile, however, the rising ground is again reached, and as the power of the engine has not been sufficient to rise to a great altitude, the wheels touch, and the machine once more runs over the surface. When it is possible to fly round the course in this manner the pupil is sufficiently advanced to take his own machine, equipped with a more powerful motor and adjusted to rise from the sloping ground. Under this method of instruction very little time is lost in repairs. The "taxi" has covered several thousand kilometers, running over the ground and flying in the air in the hands of various pupils, without a single breakage. The time necessary to

learn varies considerable, one pupil flying easily after a couple of lessons while another struggles for months. Instructor Chateau finds that the best pupils are automobilists who have had yachting experience. The automobile has made them familiar with high speed, while the gentle movements of the helm on a sailing vessel have prepared them for similar movements with the elevation rudder and warping planes of a flying machine.

For lack of a machine that would carry two, the Antoinette people have until recently been obliged to confine their instruction to theoretical explanations on land, leaving it to the pupil to make the best of his apparatus in the air. As the Antoinette monoplane is not the easiest machine to handle near the ground, there was generally a large amount of work for the repair men, and heavy bills for the pupil. Now a two-passenger machine has been made, on which Hubert Latham can take a pupil and while soaring through the air with him give practical exhibitions of the operation of the levers.

Assembling and repair work form a considerable portion of the activities of the aviation settlement. After the machines have been completely built at the factory, they are taken down to be sent by road or rail to the training school. If they are found defective, the necessary adjustments are made on the spot, a ten-mile demonstration flight is made before the customer, and the bill is ready to be paid. Antoinette in particular is well fitted up for extensive repair work. The big workshops are equipped with power-driven wood-working machinery, and a staff of thirty or forty machinists are constantly employed in this department making the delicately shaped framings for body and wings.

## PAULHAN ASCENDS 2,000 FEET IN AEROPLANE

MOURMELON, FRANCE, Nov. 25—An icy breeze was blowing over the open plain when Louis Paulhan, fresh from his triumphs in England, brought out his Farman biplane lightened and equipped for high flying. His object was to beat officially the height record of 360 feet established by Wilbur Wright at Le Mans, exactly eleven months ago. The prize for the performance is offered by Lazare Weiller, the man who bought up the Wright patents in France and formed the French Wright company. Unofficially the Wright record no longer exists, for several aviators have during the year risen to a greater altitude than that attained for the first time by the American champion.

Rising against a wind that blew from 20 to 25 miles an hour, Paulhan quickly left the ground and commenced circles which took him further and further away from the interested groups of spectators. In ten minutes he had risen to a height of 984 feet, thus beating the record allowed to Count de Lambert in his flight over Paris. A few minutes later and the officers in charge of the instruments declared that he had attained a height of 1,181 feet. The machine was a mere speck in the sky, apparently immobile, and so far away that it was impossible to even distinguish the outline of the aviator behind the canvas wind shield.

Then the descent began, gradually at first, and in huge circles, then more rapidly. At 150 feet from the ground Paulhan shut off his motor and glided down in a wide circle, touching earth as lightly as a great bird.

A few minutes after the Farman champion had landed Hubert Latham soared away on his big Antoinette monoplane. He was not officially engaged for the height prize, and no official credit would be given him for whatever he might do. As the general in charge of the Chalons camp was supervising the work of the officers at the recording instruments, Latham did not wish to loose the opportunity of ascertaining exactly how high he could rise. Up and up he soared, until the graceful shape of the bird-like machine could no longer be appreciated, and the open exhaust of the eight-cylinder motor had become muffled in the distance. At the end of ten minutes the officers in charge gave the height as 1,345 feet, thus beating the record of Paulhan, and probably rising higher than any other aviators with the exception of Count de Lambert and Orville Wright. When Count de Lambert flew over the Eiffel Tower it was believed that he had a clearance of 300 feet. As this could not be certified, however, the Aero Club decided to allow him only the height of the tower, which is 984 feet. Experts are of the opinion, however, that the actual height was not less than 1,300 feet.

When Wilbur Wright made his height performance less than a year ago the world was amazed, looking upon the affair as the acme of imprudence. Now altitude has been conquered. Louis Paulhan declares that there is nothing whatever to prevent an aeroplane mounting to an altitude of one mile and remaining there for a considerable length of time. So long as he is sure of his motor the height can be readily attained, and even in case of a stoppage there is less danger with a good machine at a great height than near the ground.

With the Farman machine that had made the official height record, Louis Paulhan came out on the following day with other records in view. The small gasoline tank had been replaced for the big one used for long distance flights; and the lubricating oil tank, which, by the way, contains pure castor oil, was also of the largest size. The Gnome motor, excellent in every other respect, has the defect of being a rather voracious drinker of castor oil, with the result that the tank has to be of much larger size than is generally thought necessary for an engine of such power as this.

The objective point was the military town of Chalons, sixteen miles away to the southeast. But before making the long distance trip Paulhan gave an exhibition of high flying that entirely eclipsed his rival Latham and amazed the spectators. With a breeze behind the aeroplane quickly soared in the direction of Mourmelon-le-Grand, a couple of miles away. At a height of 600 feet Paulhan passed directly over his own hotel, in the center of the village, by the side of the church. Still he rose higher, until the aeroplane was a mere speck in the sky, that had to be watched very closely in order to be kept in view. According to the military officers the height attained was between 1,900 and 2,000 feet, heights which had never previously been attained except by spherical balloons. A landing was made in excellent style, then there was an interval of an hour during which the aeroplane was verified and the aviator and his friends partook of a hasty luncheon.

Soon after noon the Farman biplane was off again, Louis Paulhan at the wheel, and Henry Farman following with a few friends in a fast automobile. Aided by the wind the flying machine traveled rapidly in the direction of the town of Chalons. His height was about 700 feet, which was sufficient to get over all natural obstacles on the route. Farman's last words were that Paulhan should watch the hill outside the town of Chalons, which was much higher than might be supposed. Even in a 60-horsepower automobile, traveling over perfect roads, it was impossible to keep pace with the aeroplane. For a time it was lost to view. Then as Chalons came into sight it was seen once more making a round of the city. Paulhan described a complete circle of the town in full view of the large civil and still larger military population.

Then he commenced the return journey, sixteen miles in a straight line. But the wind was now dead ahead, with the result that it was impossible to make a straight line for the sheds on the Mourmelon plain. The task of the automobile was an easy one, so easy in fact that it got ahead of the aeroplane, which was tacking like a yacht working to windward. When at last he got over the plain Paulhan shut off his motor at a height of 700 feet and glided down to where Farman and the mechanics were awaiting him.

# ROADS BUILDING NEWS FROM ALL OVER THE COUNTRY

### MACADAM PAVING MAY BE DISCARDED BY JERSEY

TRENTON, N. J., Nov. 29—So great is the stress on the road surface or "metal" as the English call it, brought about by traffic consisting of automobiles only, that macadam has been found to be unequal to it. New Jersey has always ranked in the forefront of good roads States, not alone in advocating them, but also, in actually building and maintaining them when built.

It was indeed, this latter trait which caused Col. Frederick Gilkyson, State road commissioner, to decide that macadam would not stand up under automobile traffic as well as bituminous pavement, and that New Jersey will accordingly change her road-building methods.

This decision has been reached after much inquiry and many experiments which also have demonstrated that pavements superior to the ordinary asphalt may be laid in cities and suburban districts at from $1.15 to $1.50 per square yard, where they now cost from $1.90 to $2.50 per square yard. These are known as bituminous pavements.

The State has eighty-five miles of bituminous pavement at the present time, and specifications have been prepared for thirteen miles more. In this connection New Jersey leads the world. Colonel Gilkyson is now moving in connection with the federal authorities at Washington to bring about the formation of a paving commission to supervise this method of road building, thus avoiding conflicts with any of the patented compounds.

In this way, open bidding will be possible and the cost will be lessened. The bituminous road method is practically dustless, noiseless and rainproof, and at the same time wears well under all kinds of traffic.

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### FINALLY KENTUCKY WILL HAVE GOOD ROADS

LOUISVILLE, Ky., Nov. 29—Waiting until the last moment to make official denial of its frequently reported and greatly exaggerated decease, the Bosworth-Wyatt good roads amendment to the Kentucky Constitution carried by a majority of 5,490. The amendment, which provides for raising the necessary funds by the removal of constitutional obstacles is worth all of the uncertainty and needless regret of the past three weeks. Its adoption puts Kentucky fifteen years ahead of other southern States and is one of the most advanced steps of any of the others in the direction of substantial road improvement.

The counties in the central and mountain sections showed majorities for the proposition while those in the western portion showed majorities against it as a rule. The result was a great surprise even to Senator Thomas Wyatt, who had introduced the bill, providing for a vote on the amendment. He had hoped that the official tabulation would show a majority for the proposition, but even he did not expect that the majority would be so large.

Senator Joseph F. Bosworth, of Middlesboro, who was one of the authors and strongest champions of the good roads amendment, has publicly expressed his thanks to all friends who had so ably supported the measure. This, he said, would put Kentucky in line with sister States to the north. The amendment, he said, when fully understood by the farmers, would bring hearty thanks and support from them. The editorial obituaries written within the past two weeks, the chiding of Kentuckians for their lack of intelligent self-interest, and the resolutions announced by the press of the State to continue the fight until success was won, turn out to be nothing but practical jokes.

It is expected that a number of counties, particularly those which showed majorities for the bill, will at once set about to take advantage of its provisions.

### SECRETARY OF AGRICULTURE REPORTS ON ROADS

WASHINGTON, D. C., Nov. 29—There is much of interest to motorists in the annual report of the Secretary of Agriculture submitted this week to President Taft. It is set forth that proper construction and maintenance of public highways engages public and official attention to a great extent, and the Office of Public Roads has proved its usefulness to the general public more emphatically than ever before. The adoption of State aid in the construction of public roads by more than half the States and the consideration of the question by the remainder, together with large bond issues by many counties, are indexes of the general interest being shown in the work, and have occasioned a great demand upon the office for advice and assistance. These have been given to the fullest extent compatible with the resources of the office, and have brought about more active cooperation and larger material results than ever before.

During the past year especial attention has been given to object lesson work. The purpose of these object-lesson roads was to give elementary instruction to local road builders and to demonstrate the possibilities of road improvement. The policy of the Department in this work leads neither to extremes of conservatism nor radicalism, but toward pointing out the most profitable use of material and means at hand in a given locality.

Second in importance only to object-lesson work is the experimental work of the office. The most important problem considered has been that of preventing the destructive action of automobile traffic on costly macadam roads. In working out this problem experiments have been made to secure satisfactory binders and dust preventives within reasonable cost. Excellent results have been attained in the use of asphalt, tar and other bituminous binders, waste from sugar refineries and wood pulp mills, and other by-products. It was largely to consider this question that the greatest road convention ever held was convened at Paris, in which 29 countries participated, the Director of the Office of Public Roads being chairman of the commission of three representing the United States.

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### PRIZES AWARDED FOR COMMENDABLE HIGHWAYS

NEW YORK, Nov. 29—By far the most practical and enduring outcome of the recent New York-Atlanta good roads tour lies in the awarding of the prizes for commendable roads as found in the territory met with. That is, not the prizes nor the awarding of them, but the roads which warranted the awarding of prizes, are the real practical benefit derived therefrom.

From New York to Atlanta, 41 counties were passed through. Two series of prizes were awarded to the counties, which should have made the roads through their counties in the best condition at the time of the tour. One series of three prizes amounting to $1,750 was offered by the New York *Herald* to the counties north of Roanoke, Va. Another series of three of the same amount was offered by the Atlanta *Journal* to the counties south of Roanoke. In addition to this, cash to the amount of $500 in the form of three prizes was offered by the Southern Bell Telephone Company, for road prizes to be awarded at the discretion of the judges in the territory south of the State boundary between Virginia and North Carolina, through which this company operates.

Awarding of the prizes was in the hands of a committee of three, composed of A. L. Westgard of the Touring Club of America; J. H. Pratt, State Geologist of North Carolina, and C. H. Hoyt, superintendent of road construction in the office of the United States bureau of good roads. This committee

has just announced its verdict, which will be received with much enthusiasm in the South, but one prize going north of Mason's and Dixon's line. The awards were:

**New York Herald Prizes**

First, $1,600, to Mercer county, N. J., for general excellent conditions of its roads, maintenance and bituminous macadam.

Second, $500, to Jefferson county, W. Va., for macadam pike throughout the county and having abolished the toll system. The State of West Virginia has during the present year organized a State Highway Department, upon which much responsibility rests, and is entitled to loyal support.

Third, $250, to Rockbridge county, Va., for its notable improvement of earth roads.

**Atlanta Journal Prizes**

First, $1,000, to Guilford county, N. C., for wide, well-graded road and macadam in first-class condition.

Second, $500, to Spartanburg county, N. C., for its notable improvement of all its roads through the county.

Third, $250, to Henry county, Va., for the excellent condition of its earth roads.

**Southern Bell Telephone Company's Prizes**

First, $250, Greenville county, S. C., for its notable improvement of its highways throughout the county.

Second, $150, to Bessemer City Township, Gaston county, S. C., for relocating and grading road over mountain.

Third, $100, to DeKalb county, Ga., for the interest shown and improvement made in its roads throughout the county.

In reaching the above decisions, the committee took into account seven features of road construction, as follows:

(a) Alignment.
(b) Grading.
(c) Width of roadway between ditches.
(d) Width of roadway surfacing.
(e) Condition of surfacing.
(f) Slope of shoulders and condition of ditches.
(g) General appearance of roadside.

On the basis of the seven points, the awarding of first place to the roads of Mercer County, N. J., with special mention of the work done there in resurfacing the present macadam and of the laying of bituminous macadam, the latest type of automobile road construction, is or should be cheering to the Jersey road commission, which has just decided to abandon all other forms of road in favor of the newer bituminous macadam.

### DISGRACEFUL CONTROVERSY OVER BERLIN TURNPIKE

HARTFORD, CONN., Nov. 29—The much-mooted Berlin turnpike is once again in the limelight and the situation to say the least is farcical. It will be recalled that the latter part of October this seven-mile stretch was formally opened by the Connecticut State highway commissioner, James H. MacDonald. The Automobile Club of Hartford jumped in and organized a sociability run for which various prizes were offered and in the evening, the most pretentious banquet ever held by the Automobile Club of Hartford was given at the Allyn House where the club quarters are located. The highway commissioner was the chief guest of honor. But so far so good.

Shortly after the formal opening of the road and the lauding of the commissioner, there were numerous complaints of the apparent poor condition of the new road, which was constructed by three different contractors, including one from Massachusetts. Now, then, although the commissioner opened up the road he has not yet accepted it in behalf of the State and the contractors were not, of course, paid for their labors.

One contractor, being well aware of the stress subjected by motor cars, asked that the road be oiled or tarred at his own expense, but the State highway commission did not grant the necessary permission so to do, at least this is the story said to have been told by the contractor himself to a newspaper man. The road has not apparently stood up under traffic in the manner that it should, and has been the chief topic of motordom for some time past.

The climax was reached, however, when one of the contractors who built the Hartford end of the road closed up the Hartford terminus by dragging large wagons filled with stone across it. The contractors have had to make such repairs as were necessary before acceptance by the State, at their own expense. The coming of the rain and snow moved the contractor to a decisive end and he blocked off the Hartford terminus so that further damage could not be done to the road at his expense. It was the contractor's intention to thus close the road until the commissioner had accepted it. Users of the highway, however, would not stand for this and the wagons were hauled off the road, and now it promises to be a merry war between the contractor, the commissioner, and the general public.

## DEATH OF W. F. FULLER, OF CONNECTICUT

HARTFORD, CONN., Nov. 27—William F. Fuller, president of the Connecticut Automobile Association, and former president of the Automobile Club of Hartford, died of heart trouble at his home in this city this morning, after a lingering illness. Mr. Fuller was first taken ill last May.

In William F. Fuller the automobilists of Connecticut lost a champion who was ever zealous to further the interests of the sport and the industry. He was president of the Automobile Club of Hartford for two terms, holding that office until the last election, when he stepped down in favor of General Wallace T. Fenn, the present incumbent. He was re-elected president of the Connecticut Automobile Association at the last election. The Automobile Club of Hartford during his régime was marked by a rapid growth in both membership and influence.

Although his death was not unexpected, it nevertheless came as a shock to his many friends. His wife and two children survive him. Mr. Fuller was engaged in the leaf tobacco business with his uncle, under the firm name of E. A. & W. F. Fuller.

## ORGANIZATION OF NEW BAY STATE CLUB

GREENFIELD, MASS., Nov. 27—The Franklin County Automobile Association has been organized, with an initial membership of one hundred. Its principal work will be agitation for the improvement of the roads in Franklin County. Rev. C. W. Merriam is president; Dr. J. C. O'Brien, vice-president; Dr. E. L. Major, secretary, and A. B. Allen, treasurer.

## BUFFALONIANS FORM AN AERO CLUB

BUFFALO, N. Y., Nov. 30—The Aero Club of Buffalo was launched this week at the Automobile Club of Buffalo's quarters. The officers are John M. Satterfield, president; H. A. Meldrum, Howard A. Forman and Robert K. Root, vice-presidents; George P. Urban, treasurer, and Dai H. Lewis, secretary. The board of directors includes the officers and E. R. Thomas, James How, George Bleistein and Ralph H. Sidway.

The club will be incorporated as soon as the necessary papers can be made out. The membership will be limited to 500, and the dues will be fixed at $5 a year. The initial membership is fifty.

The constitution will provide that the membership shall be composed wholly or in part of persons owning aeronautic inventions for personal or private use, and that it shall be the object of the club to encourage aerial navigation by promoting excursions, races, congresses and expositions. The meetings will be held for the present in the rooms of the automobile club.

## SIGN POSTS ERECTED NEAR BALTIMORE

BALTIMORE, Nov. 29—The Automobile Club of Maryland is making rapid progress in the erection of sign posts along the roads leading from the city. Already many of the signs are in position along the Edmondson avenue pike, the Aanapolis pike and Belair road. The club has appointed J. B. Hutchinson as assistant secretary to Secretary Frank Darling.

# Some Pertinent Hints on Adjustment and Care

By Stillman Taylor

WHEN a car is not running smoothly and powerfully, as every well-cared for automobile should do, something is wrong, and the driver should lose no time in tracing the car's indisposition to the probable cause. To diagnose accurately the list of possible troubles and their causes which may befall the several parts of an automobile, is a matter demanding considerable experience, but as the most prevalent troubles are common ones and not difficult to remedy when once located, the average driver who has even an ordinary amount of "gumption" should meet with no difficulty in setting things right when the nature of the failure is made clear to him.

Some of these troubles are, of course, impossible for the driver to repair, and require the services of a good mechanic with a well-equipped machine shop at his disposal. Others are more in the nature of a complete breakdown, which concern a very badly worn, bent, or broken part, and these difficulties are best solved by replacing the defective part with a new one ordered from the factory or the nearest agency. Such failures are naturally outside the scope of this article, which is only written with the idea of assisting the inexperienced driver to first locate the seat of trouble, and then to "tinker up" the offending part.

**Importance of Bearing Adjustment and Care**—Owing to the important duty which the bearings are called upon to perform, it is very necessary that these vital points should be given a periodical examination with a view of ascertaining the exact condition of the surfaces. Friction in a bearing implies wear and loss of power, and a machine cannot run at its best unless this adhesion and rubbing contact is eliminated as far as possible. This can only be secured by keeping the bearings clean, properly adjusted, and well lubricated.

Cleanliness is of the utmost importance, and if any dirt or other hard particles work into the bearing surfaces, no amount of oil will keep the bearing from cutting and rapid wear. Grit or other hard foreign substance on the rubbing surface will be certain to injure the polished metal of the bearing, and if cleaning is neglected, the surfaces will become rough and the metal badly scratched and scored. If this is found to be the case, it will be necessary to scrape and refit both the bearing and its shaft. This is a job which few amateurs care to attempt, as it is a phase of overhauling demanding experience and good workmanship to insure a good fit.

Looseness in a plain journal bearing is easily taken up by removing the brasses, and carefully scraping their faces until sufficient metal has been removed to make them fit more snugly. A plain bearing should be invariably adjusted to a snug fit, as any appreciable looseness will result in a continuous "knocking" in the cylinder. It is a good plan, however, to set up the crank-pin and connecting-rod bearings with just a slight amount of side play, and a good mechanic will generally allow some 1-16-inches play in the engine bearings, that the required degree of flexibility may be secured.

Ball bearings are practically immune from trouble if ordinary care is taken, but a ball may break occasionally, and when this occurs an entire new set of balls should be inserted. If the grooved annular rings, or ball races, show any considerable wear, the whole bearing—rings, separator and balls—should be replaced with new. This is always the best plan, as the life of a ball bearing and its efficiency in reducing friction depends altogether upon the uniformity of the balls. In fact, the balls must be of the same size, as a very small difference in their diameter will tend to prevent them from rotating freely, and rapid wear of balls and races will result. It is very necessary that ball and roller bearings be kept clean and given ample lubrication, and if this is consistently attended to the bearings will perform their functions without trouble, and with maximum life.

The bearings of the transmission or change-speed gears, in particular, should be given good care. These gears are generally given hard usage, and more or less friction of their edges is unavoidable even if the gears are thrown in with a fairly skillful hand. Improper gear changing will, on the other hand, bring excessive wear on the gears, and this constant grinding of their edges before they finally mesh, will quickly wear off particles of metal which, being carried to the bearings by the lubricant, will have a marked tendency to cut and rough the bearings. It is desirable for this reason frequently to drain off the old oil from the gear case, and wash it out thoroughly with kerosene.

**Cylinder and Piston Troubles**—Although the cylinders should not as a general thing require much attention other than keeping them clean and well lubricated, there are nevertheless a goodly number of cylinder troubles which are primarly causd by carelessness on the part of the driver. A cracked water jacket is not a common trouble, although most garage men have a dozen or so burst jackets to repair every year. A fractured jacket may be caused by the water freezing and bursting the walls as it expands; or it may be caused by filling up the water-circulating system in the mistaken endeavor to cool off the motor when it has been allowed to become overheated. Both of these troubles may be easily avoided if proper care and attention is given the car while in operation, and troubles of this kind seldom, if ever, occur to a car driven by one who is particular and methodical in caring for his machine.

It may seem superfluous to warn the autoist that the water should not be allowed to freeze in the pump or pipes of the circulating system, yet many cars are laid up every winter through neglect in following what should be obvious to the most inexperienced tyro. Freezing may be avoided either by emptying the entire water-cooling system, by heating the garage above the freezing temperature, or by adding glycerine, calcium chloride, or some other anti-freezing agent to the water before it is poured into the radiator. When draining off the water, particular care should be taken to remove the filling cap of the radiator, and to open all the water cocks, not forgetting the drain cock on the under side of the circulating pump. When the pump or the connecting pipes have become frozen, they must be thawed out before an attempt is made to start the motor.

In the case of excessive overheating, cold water should not on any account be poured over the cylinders to reduce their high temperature, neither should cold water be poured into the radiator. If this is done, the rapid contraction of the metal will be almost certain to start a crack, which may be simply a fracture in the outside water jacket, or result in a rupture running through the cylinder wall.

**Stopping Water-Jacket Leaks**—A small exterior crack in the water jacket may be satisfactorily patched up by filling the aperture with one of the several iron cements sold for this purpose. A fracture of the inside walls can only be repaired by means of the autogenous welding, or other patent brazing process, which is, of course, a machine-shop repair.

Although a porous or spongy cylinder casting is rarely met with on any standard grade car, defects of this kind are occasionally met with in a few of the cheaper machines. In a porous casting, the minute holes—technically termed blowholes—will produce slight leakage, and moisture or sweat will gather on the outside of the defective cylinder when the motor is running. A leak of this nature may be permanently repaired by stopping up the outlet opening and filling the water jacket with a strong solution of salammoniac. Allow the solution to stand in the jacket for some forty-eight hours, then empty and rinse

out with cold water. This strong alkali solution will form a rusty deposit on the inside walls, which will fill up the small holes and effectually prevent further leakage.

Ample lubrication of the cylinder walls is very important, as lack of lubrication may result in seizing of the piston, which being dry will score and roughen the cylinder walls. A loose-fitting piston pin will also score and scratch the bore, by working out sufficiently to rub against the walls. As a loose piston or wrist pin will produce "knocking" in the cylinder, this matter should be located and attended to at the first sign of trouble. If the cylinder has become badly scored, its compression will be poor, and the only remedy is to put in a new cylinder or to rebore the damaged one and fit a larger piston. As a new cylinder will cost anywhere from fifty to eighty-five dollars, and as reboring can only be done on a single-cylinder car, and requires expert labor at so much per hour, the proverbial "ounce of prevention" is an axiom well worth remembering.

**Kerosene Is Good for Pistons**—The pistons should give little if any trouble providing they are kept free of carbon and given proper lubrication. Many careful drivers make it a point to inject a small quantity of kerosene through the compression cock of each cylinder at weekly intervals, and by so doing prevent the accumulation of any considerable deposits of carbonized oil. This is an excellent plan, but it will, of course, thin the lubricating oil in the crankcase, and when this is done the sump should be drained off and replenished with fresh oil at least once a month. Before refilling the crankcase, it is a good plan to fill up the cylinders with kerosene and let them stand overnight—or a couple of days, if the car is idle—then drain off and refill with fresh oil to the required level.

Poor compression is frequently caused by worn piston rings, or rings which have worked around in their grooves until the joints are nearly in line, thus opening up a passage for the escape of the gas. In cases of this kind the cylinder should be removed and the piston rings closely examined. If the gas is escaping past the rings, a sooty mark across their faces will point out where the loss is occuring. That a reasonably high compression may be secured, the joints of the piston rings should be broken; that is, the joint or slot of each ring should be given a quarter turn away from the joint of the other ring. To avoid their shifting about, many makers are pegging the piston rings in their grooves, thus doing away with any possibility of the slots coming into line.

When a loud thumping knock develops in the crankcase of the motor, it may be taken as a pretty infallible indication that either the timing is faulty, or that the mixture is prematurely ignited. Excessive spark advance will start "knocking," and the same noise will be heard and felt if the high gear is kept in too long when taking a stiffish grade. Although the connecting rods and crankshaft are not easily broken, these severe internal strains and stresses are bad for the motor. Indeed, there is really no excuse for trouble of this kind, as it is mainly due to carelessness and downright abuse of the car, of which not even the novice should be found guilty. To start a car by racing the motor and throwing in the clutch with a bang, is a piece of foolishness only sanctioned by racing drivers, who must get speed at any cost. The average driver should not endeavor to emulate this spectacular professional manner of starting his car, but should stick to common-sense methods.

**Choked Muffler and Exhaust Pipe**—Muffler troubles are not so common as one would suppose, considering that comparatively few autoists seem to think that this part of the car ever is in need of attention. Although unimportant, compared to the other units of the machine, this end of the power plant should not be allowed to become choked up with soot. Explosions in the muffler—due to improper ignition and poor carburetor adjustment—should be avoided so far as possible, as this after firing subjects the muffler to considerable strain, and may even result in a rupture of the muffler walls. When the car is given an overhauling, the muffler and the exhaust piping should be removed, taken apart and thoroughly cleaned. When the baffle plates or silencer pipes are allowed to become encrusted with carbonized oil, a considerable amount of back pressure will result, and while this retardation of the exploded gases will soften the noise of the exhaust, the motor will show a marked loss of power.

**Steering Gear Should Not Be Neglected**—The steering gear is one of the most important units of the car, and the failure of this mechanism at a critical moment has been the cause of many serious accidents. Although accidents may occur through the sudden breaking of a defective part, mishaps of this character are more apt to be traced to neglect on the driver's part than to a flaw in the material. Ample lubrication is one of the chief requisites, and a little oil will contribute much to secure smooth and easy action of the control mechanism. Any appreciable amount of backlash or side play should be taken up as soon as the trouble is detected, and the adjusting nuts should be tightened up until the front wheels instantly respond to the motion of the steering wheel. The steering rods and levers should not be neglected, and if backlash is present, the matter demands immediate attention.

In the case of a ball joint, it may happen that the ball is considerably worn, and if this is found to be the case, it should be replaced. When pins are used, it will be found that they have worn too small for their holes, and the insertion of new pins of slightly larger diameter will solve the trouble. The swivel pins of the steering heads may likewise need adjusting, and any play in this part may be located by rocking the car to one side. Backlash may be also frequently traced to a loose wheel bearing, which may be due to a broken or badly worn ball or race, or it may require nothing more than adjusting. The wheels should rotate freely and the adjusting cones and lock nuts should be only screwed up sufficiently to prevent side play, but not so tight as to bring strain on the balls, which are easily broken.

**Some Common Clutch Troubles**—The clutch is a much-used member of the car and should upon this account be given a certain share of attention. If the motor speeds up and races and the car runs slowly, it is a sure sign that the clutch is slipping, and this characteristic symptom indicates grease or oil on the leather face, or a weak clutch spring. If oil is the trouble, a little gasoline injected between the two members of the cone will cure the trouble. In case the clutch spring is weak, the tension should be increased by removing the set screw and adjusting the clutch spring by means of the adjusting nut provided for that purpose.

Slipping may also be caused by a dry and hard clutch leather, but a leather in this condition will generally "bite" and take hold so suddenly that the driver will have no difficulty in tracing the trouble to the proper source. Of course, the leather should not be allowed to become hard and stiff, but given an occasional dressing of castor or neatsfoot oil. If this is done at regular intervals, only a small quantity of oil will be required to keep the leather in good shape. For best clutch results the leather should be soft and pliable, but not spongy.

A fierce gripping cone clutch may also be caused by the leather wearing down so as to expose the rivets with which it is fastened. In cases of this kind an examination may find the leather face badly worn, in which event a new leather should be riveted in place. If the leather is found to be in fairly good condition, the rivets should be reset about 1-16 of an inch below the face of the leather.

Clutches of the plate or multiple-disc type generally work in oil and seldom give trouble if supplied with sufficient oil. The old oil should be drained off about once a month, the clutch washed out with kerosene, and fresh oil put in. Many disc clutches consist of a number of cork-faced bronze discs running between steel discs, and through wearing down of the cork inserts, the clutch pedal may work backward until it rests against the slot in the flooring. When this occurs the clutch will slip and fail to hold properly, and the lever should be readjusted. A slipping disc clutch should be attended to at once, as it is likely to burn out and the plates seize or stick together.

# Problem of the Private Garage

By Morris A. Hall

Part 7

Tarrytown Garage on Historic Ground. In 1781, the First Continental Brigade Held a Line of Intrenchments on This Site

BEYOND the advantages which go with the solid concrete garage, that is comparatively solid, there is much to say for the structure built from some other material and surfaced with cement. This kind of building, when properly built has all of the advantages of the all-concrete, designated above as solid, and supposedly many more. Thus, the house of hollow tile, either terra cotta or other material, properly surfaced is said to be warmer in winter and cooler in summer, besides being more dry at all times, less liable to settle on acccunt of lessened weight, and this, too, at practically the same cost.

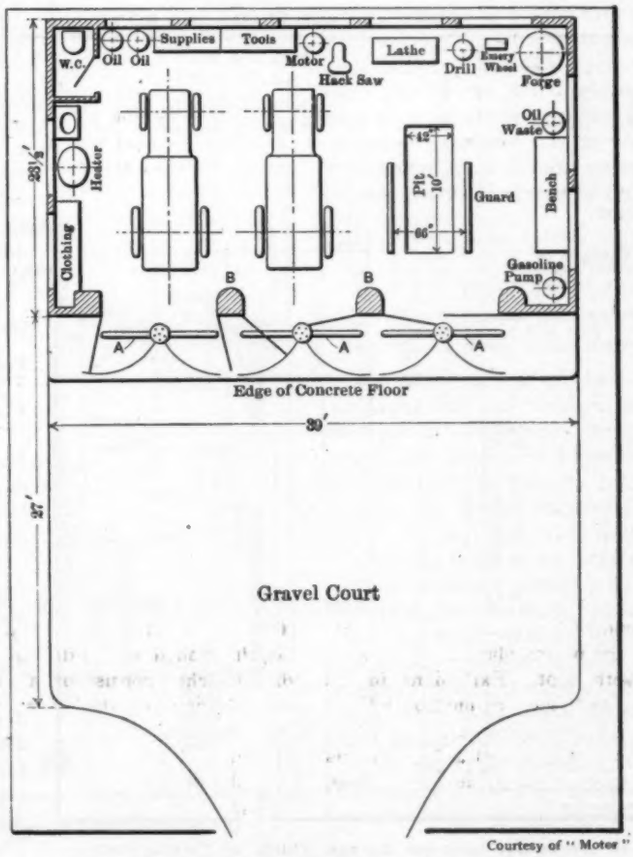
Hollow tile making has advanced rapidly in the past five years under the stimulus of much building, so that it is now possible to obtain these in a variety of shapes and sizes. This enables the selection of the proper one for the work in question. In this way, it is now possible to obtain not only special corners, special lintel and sill tiles, but also, specially dove-tailed blocks. The function of the dovetail is to hold the cement or stucco in place.

**More Concrete Examples—** Before going into this hollow tile form to any great extent, perhaps it will be best to conclude the concrete chapter, that is, the all-concrete or solid construction as distinguished from the form in which the cement is but a surface covering, a coat of thick paint as it were. The function of a protective covering renders the cement a minor quantity in the reckoning, reducing its importance very materially. In fact, making it so small as to be insignificant, or at least, not worthy of consideration in an article of this scope.

Elsewhere on this page is shown (through the courtesy of *Motor*) a concrete garage, as planned for three cars. The scope of this house is a very wide one, showing that the question of money did not enter into its design or equipment.

In size, the inside dimensions are 38 feet wide by 23 feet deep. But both of these are reduced by the large array of tools around the walls, the width, perhaps more than the depth, since in the former there are tools or closets along two sides, the size of which must be subtracted, while as to the latter, those along the back only need consideration.

As the tools provided are very complete, more so than any one man would undertake to propel through his own efforts, a source of power must be provided. If electric power had been available for lighting, all of the tools might have been driven from a motor, which in turn was supplied with motive power from the lighting wires.




Courtesy of "Motor"

Three-Car Concrete Garage With Full Equipment

This was not the case, however, so a gasoline motor was provided, of the vertical type to save floor space, and located close to the tools to be driven. The latter include a power hack saw, a lathe, drill press, emery wheel, and dynamo to supply light. In addition to these tools, there is a very large work-bench, a forge for doing light forging or bending, a heater to keep the place warm in winter, and storage for oil, waste, gasoline, clothing, small tools, and supplies. The gas engine for power may be used to help out on the heating, the jacket water being furnished the heater or piped around the building separately. If it had been desired to utilize this to the full extent, the exhaust gases might have been led into a closed heater composed of large diameter coiled pipes around which water circulated, the heat of the exhaust within heating the water.

Provision was made for three cars, each with its own doors, and runway. In addition, there was a pit, but the maneuvering of the cars was all done outside

on the large gravel court, directly in front of the building. This reduced the movement of the cars within the building to a straight in and out movement. The space is thus utilized to its fullest extent, all of the inside space around the cars being useful for working on them. To take any car to the pit, even if there was a car already over it was a simple operation consisting of but two motions. The car on the pit ran straight out, describing an S curve to the left side of the court, and stopping at the outer edge of the latter as far away from the house as the court extends. It was then in a position to back directly into the place vacated by the other car.

In bringing out the car to go to the pit, it described another S curve, this time to the right side of the court. Then, a simple straight backward motion brought it through the door and over the pit, as desired. This operation was equally simple whichever car was moved, and to whichever place inside of the garage it was intended to move it.

**Another Set of Plans**—To close out the concrete story, another set of plans will be given. These show the largest yet shown. In size, it is 30 feet long by 24 feet wide, sufficient to accommodate two cars easily, and if the doors are planned right, three. In fact, the actual floor space afforded by this design is but 15 per cent. less than shown for the three-car garage on the previous page. In height, a peaked roof, coupled with the large width and a normal slant, have resulted in a height of 18 feet 6 inches. With a mansard effect, this might have been reduced to 16 feet 6 inches, or by redesigning, with this object in view, to 14 feet 6 inches.

Both changes would, however, result in an increase in the cost of the roof trusses, these being four in number. Had the roof been planned of wood or other materials, this change would have turned out to be a money saver, but with the extra work of the structural roof trusses, the saving in material is more than offset and the result is increased expenditure.

To many, this, resulting in an improved appearance, would be well worth while, since a person constructing a two- or three-car garage, does not have to figure in the pennies. It will be noticed that the design calls for a structural framework, for which the natural covering would be some form of metal lath, covered with cement plaster. The exterior, however, might be given a smooth, a stucco, a pebbled, or other appearance as fancy dictated, the basic design being such as to allow any one of these, or combinations of them.

Provision is made for a small door and a window at one end, which may be varied for the other end to three windows, one in each bay. Or, the door-and-window effect may be duplicated. At the side, one large double door and two windows are shown, the other side being left to the builder's fancy. This would doubtless result in the most useful form, namely three large windows. The side shown, on the other hand, would be altered for two or three cars by the changing of one or both of the windows into additional means of ingress and egress for the cars. These would take the form of more double doors, duplicating the one shown.

Both the changes from windows to doors would reduce the expense of the steel work, as extra framing would be eliminated by the change. To replace doors by windows, on the other hand, would have the opposite effect, in that the framing would be increased, and with it, the cost.

**Amount of Material Called For**—In estimating the material necessary and the cost of the same, for this garage, the following result was arrived at:

**Bill of Material and Estimate—Three-Car Garage**

Roof, 1,150 sq. ft. of metal lath.
1,110 sq. ft. of 1½-in. concrete and plastering on inside.
Waterproofing at 3 cts. per sq. ft. $33.30
Walls, 1,220 sq. ft. metal lath.....
1,200 sq. ft. 2 in. plastering.
Windows, complete in place..... 15.00
Doors, complete in place..... 29.00

By far the largest item has been left out, namely the metal lath and its covering. The cost of this might run up to ten times the other items, taken collectively, so that it is idle to try to estimate the cost from this scant data. As a rough guess, this garage should cost at least $1,500.

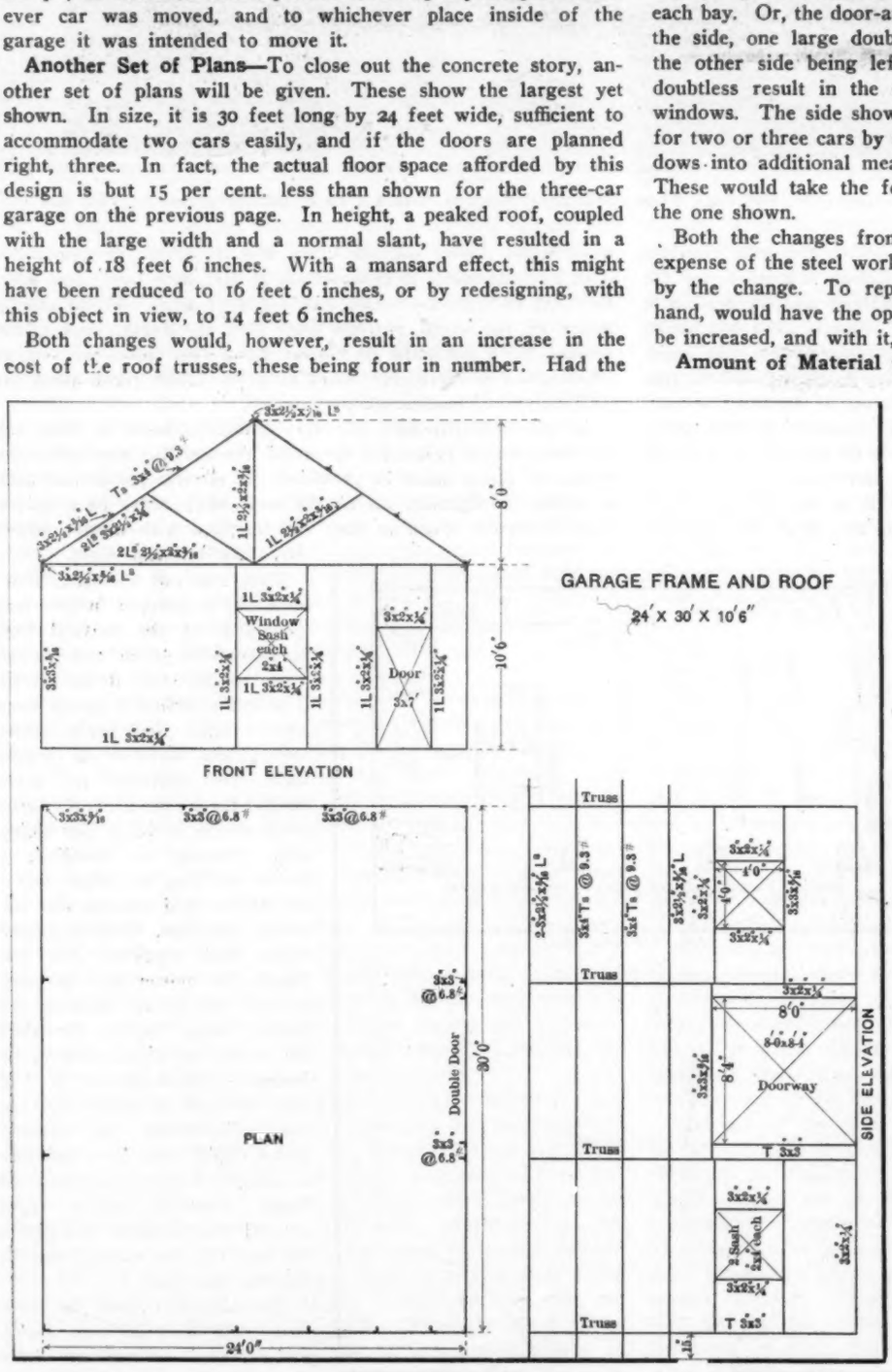
An estimate of the weight of this structure gives these quantities:

Frame and connections.....1,370 pounds
Trusses, four at 500 each, with connections.....2,000 pounds
Purlins, angles, tees and connections .....2,130 pounds

Making the total weight without windows, doors, paint, blinds, floor, or interior equipment at least 5,500 pounds.

From this, the total weight on the foundations might run up to 8,000 pounds, or four tons, very easily, and in the case of a very thick, heavy floor, to 9,000 pounds or more.

One other noticeable fact of this design is worth attention. In the usual case, there is plenty of room for the garage, so that the matter of a proper approach, in connection with the doors need not be given a thought. There are cases, however, in which




Framing Plans of Iron Work for Three-Car Concrete Garage, Thirty by Twenty-four

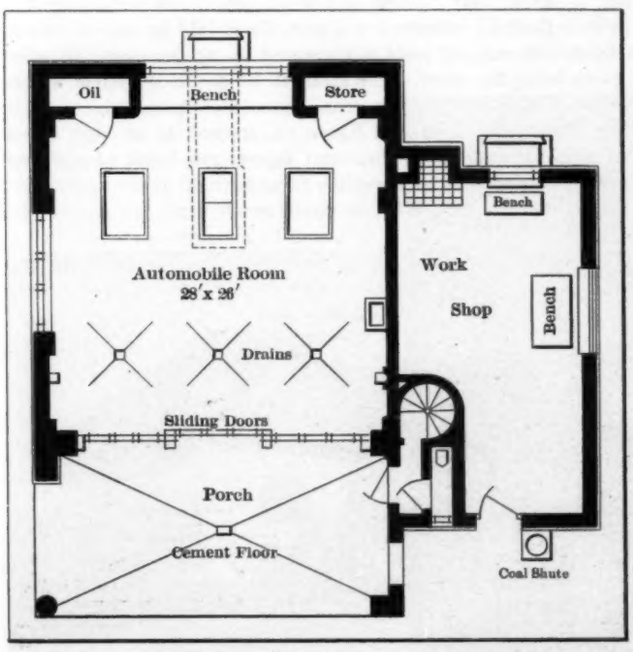
this design might be favorably thought of, but under conditions that precluded the use of side doors. This has been provided for by leaving the left hand end panel blank, or plain. In a case where the side doors could not be utilized, this space would be large enough for any sized door, being 11 feet by 10 feet 6 inches. In the usual case, additional framing would be resorted to with the use of an 8 feet by 8 feet 6 inches double door.

**Illinois Man's Design Presents Novelties**—Elsewhere on this page is shown a garage (concrete) built by an Illinois man, which shows a number of novel and interesting features. The drawing shows only the ground floor plan, the second story being devoted to living rooms for the chauffeur. Since the arrangement of the latter has very little connection with the garage story, no attempt will be made to illustrate or describe it, other than to call attention to the winding stairway, reached from both inside and outside by separate doors. This is fully as effective as any other form, and economizes on space.

Three cars are provided for, although the owner has but two. The provision, in marked contrast to the usual case, is in triplicate, three pits and three washstands being provided, as well as three doors. The front end of the house includes a porch with cement floor and housed over by the living rooms above. This would, without doubt, be used for most of the washing done in fine weather, in preference to the washstands within. In fact, it would appear as if the designer, a well-known Chicago architect, had this idea in mind.

Most notable in the whole design is the large and very roomy workshop provided alongside of the motor room, yet entirely separated from the latter by a thick solid wall. Without a doubt, this would reduce the fire hazard very materially were the gasoline kept in the work room. The floor plan, however, does not indicate this, and the oil being in the automobile room, one is forced to the conclusion that the fuel was kept there as well. In that contingency, not only is the fire hazard not reduced, but on the other hand, all parts or units to be worked upon would of a necessity have to be taken out of the car, carried outside through the big sliding doors, and then back into the work room through the front door. The same process would have to be gone through after the repair had been effected. It sounds like a small thing, but this would mean lots of extra work, and looks like a real flaw in the design.

Among the good features may be noted the location of all work benches—there are three shown—in front of windows. The only work bench in the automobile room is placed at the back in front of the large and wide window there, while the two benches in the shop are placed directly in front of the only windows in that room. This will give lots of light for work that is to be done. Light is very important, and although the doors were intended to have windows set into them, it must be said that the provision for light in this case has been subordinated to architectural effect. Thus, the main room should have another window the size of the present one, the two being set equal distances from the front and rear. More than this, there should be another large window in the side of the work room, the present one being moved back so as to make room for it.




Lincoln, Illinois, Concrete Garage of Original Features

Two-Story Garage of Terra Cotta Hollow Tile Construction

**Hollow Tile Concrete-Covered Garage**—This fault, lack of light, is not found in the other garage illustrated on this and the next page. Not only are there many windows on each side, two being placed at each end of the room, but the ends are well lighted. The latter is effected by means of windows in the doors, and in addition a good-sized window on each side of the big doors. That this really results in a well-lighted interior may be seen in the interior picture, taken by natural light.

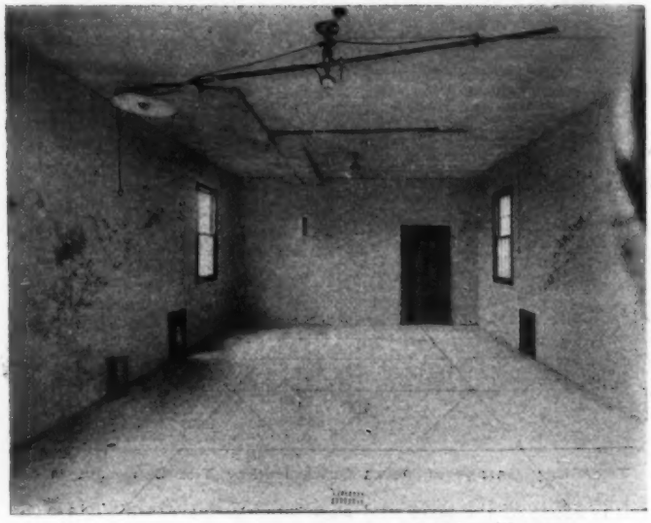
This building is constructed of terra cotta hollow tile, covered with cement, the latter giving it all of the appearances of a concrete house, while retaining the good features due to the hollow tile. One of the first questions raised in connection with any such form of construction is that of the cost. In answer to the unspoken question of costs, the following table shows an estimate of the costs of different systems of building, based upon an average dwelling located in the vicinity of New York City:

(a) $10,000 Frame.
(b) $11,000 Brick outside walls, wooden inside.
(c) $10,250 Stucco on expanded metal, wooden inside.
(d) $10,500 Hollow terra cotta blocks stuccoed, wooden inside.
(e) $12,000 Hollow blocks stuccoed—fireproof throughout except roof.
(f) $14,000 Hollow terra cotta block walls faced with brick, fireproof floors and roof.
(g) $15,000 Brick walls—fireproof floors and roof.

The above figures are based on an average taken from two architects and two builders, who have had experience with the methods of construction designated. Reducing these figures to small units, taking the frame dwelling as unity, we have: Frame, 1; brick (b), 1.1; stucco (c), 1.025; terra cotta stuccoed (d), 1.05; hollow blocks stuccoed (e), 1.2; hollow terra cotta, brick-faced (f), 1.4; and brick walls, fireproof construction (g), 1.5.

Applying these to an average garage ample for one car, and well designed, the resulting figures would be: (a) Frame, $1,000; (b) brick outside walls, wooden inside, $1,100; (c) stucco on expanded metal, wooden inside, $1,025; (d) hollow terra cotta tile blocks stuccoed, wooden inside, $1,050; (e) hollow blocks stuccoed, fireproof throughout except roof, $1,200; (f) hollow terra cotta block walls faced with brick, fireproof walls and roof, $1,400; (g) brick walls, fireproof floors and roof, $1,500.

This particular garage is built for one car, and as such the floor space allowed is unusually large. This being the case, the chauffeur's quarters above, occupying the whole second floor, are



Interior of Garage Part of Hollow Tile Building

also very commodious. This is the Morris garage at Westchester, N. Y., and is built of hollow terra cotta tile, covered with cement. The construction, in fact the tile themselves, may be seen in the picture of the inside shown elsewhere on this page.

These are set up on edge, so that the hollow or hole through the base layer carries clear up to the top. The ceiling, in this case also the floor for the second story, is made up in the same way, except that the tile are laid flat so that the interior holes progress across the building. The floor tile are laid between reinforced concrete beams, which form the supports. If desired, the supports could have been structural steel, either I-beams or channels, or wooden beams might even have been used. The latter would have the advantage of giving a good foundation to which to attach floors or ceilings of wood, but this would be completely overbalanced by the fact that their use would detract from the fireproof qualities of the structure.

In the foreground may be noticed the drain for the washstand, the interior of the garage at the time this picture was taken being bare just as the builder left it, and before it had been occupied by either the chauffeur or the car.

**Terra Cotta Garage in Process of Construction**—The two illustrations below show a garage-stable as completed and when but partly completed, a before and after effect. In the left hand picture the building is about half finished. The tile may be seen very plainly, the lines of demarkation between each tile and its neighbor being distinct.

In the second picture is shown the garage as finished, the tiles for the roof being in place, the walls covered with the cement plaster, and the dormer windows being coated as well. This picture is not taken from the same viewpoint as the first one, as the first shows the back, while the last one shows the front of the building with the entrance at the left.

It is a wide, spacious entrance, flanked by a pair of square posts of good height. The doors and windows used carry out the scheme of the rest of the building very effectively. This structure is located at Monmouth Beach, N. J.

A record was made in its construction, ground being broken on May 9, and the building being completed on July 3. This made the elapsed time but 55 days. The tile used varied somewhat. Those for the first story, that is, up to the eaves, were 8 inches thick. All tile used above that were smaller, of but 6-inch thickness. Despite the very ornamental character of this building, and the great haste in which it was erected, the cost was very low. This amounted to but 22 1-2 cents per cubic foot of contents, that is the whole cost, divided by the number of cubic feet in the walls, etc., amounted to this figure. The roof tile are a bright red in color, and in form are the S tile. That is, the section through the tile forms an S. In assembling or laying, half of each tile overlaps the one next to it, the water and weatherproof qualities being obtained by this overlap.

**Strength of Hollow Tile for Floors**—The idea that tile has no horizontal strength is somewhat prevalent. This idea is erroneous, as will be shown. Thus, a floor system composed of hollow tile set horizontally, with a 4-inch beam of reinforced concrete between each pair of tiles, the concrete carrying varying sizes of rods and of a composition of 1 part Portland cement to 3 parts sand and 5 parts gravel, has the following strength:

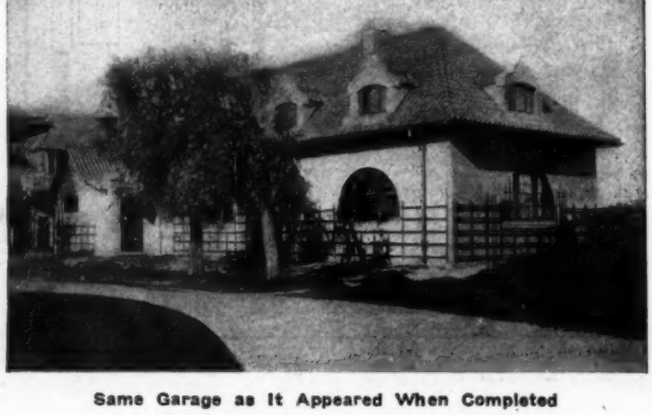
**LOAD TABLE OF HOLLOW TERRA COTTA TILE FLOORS**
**Safe Live Load in Pounds per Square Foot—Factor of Safety=4**

| Span in feet | 12-in. Tile, 1-in. Rod; Dia. Weight per sq. ft. 68 lbs. | 10-in. Tile ⅞-in. Rod; Dia. Weight per sq. ft. 58 lbs. | 9-in. Tile, ⅞-in. Rod; Dia. Weight per sq. ft. 57 lbs. | 8-in. Tile, ⅞-in. Rod; Dia. Weight per sq. ft. 48 lbs. | 7-in. Tile, ¾-in. Rod; Dia. Weight per sq. ft. 43 lbs. | 6-in. Tile, ¾-in. Rod; Dia. Weight per sq. ft. 38 lbs. | 5-in. Tile, ¾-in. Rod; Dia. Weight per sq. ft. 30 lbs. | 4-in. Tile, ¾-in. Rod; Dia. Weight per sq. ft. 26 lbs. |
|---|---|---|---|---|---|---|---|---|
| 5 | 2512 | 1942 | 1608 | 1377 | 934 | 692 | 477 | 294 |
| 6 | 1722 | 1327 | 1100 | 942 | 636 | 470 | 320 | 196 |
| 7 | 1247 | 962 | 796 | 680 | 456 | 334 | 230 | 137 |
| 8 | 941 | 725 | 596 | 509 | 338 | 248 | 168 | 99 |
| 9 | 729 | 559 | 461 | 392 | 258 | 188 | 127 | 73 |
| 10 | 577 | 442 | 363 | 308 | 202 | 145 | 97 | 54 |
| 11 | 466 | 355 | 291 | 227 | 158 | 113 | 75 | 40 |
| 12 | 379 | 289 | 236 | 199 | 126 | 89 | 58 | 30 |
| 13 | 313 | 238 | 193 | 163 | 101 | 70 | 45 | 21 |
| 14 | 261 | 197 | 160 | 134 | 80 | 56 | 35 | 14 |
| 15 | 218 | 164 | 132 | 110 | 65 | 43 | 26 | 9 |
| 16 | 184 | 137 | 110 | 91 | 48 | 33 | 19 | 5 |
| 17 | 155 | 115 | 92 | 75 | 41 | 25 | 14 | ... |
| 18 | 131 | 96 | 76 | 62 | 31 | 18 | 9 | ... |
| 19 | 111 | 81 | 63 | 51 | 22 | 11 | ... | ... |
| 20 | 93 | 67 | 52 | 41 | 17 | 8 | ... | ... |

For a floor of cement, 1 1-4 inch thick, laid on top of this as a finish, the size of rods is increased by 25 per cent., all other figures being the same. The strength of the floor system is then increased by about 75 per cent. above the figures given in the table above, and from that figure on upward, to as high as 160 per cent. in some cases, the exact figures not being of sufficient interest to warrant repeating the table here.

*(To be continued.)*

Hollow Tile Garage in Process of Construction



Same Garage as It Appeared When Completed

# UTILITY AND IMPORTANCE OF PROPER ENGINE TESTING

BUFFALO, N. Y., Nov. 29—The E. R. Thomas Motor Company has inaugurated a system of block testing that ranks with the best in the country. In the past, many factories have regarded the block-testing department as unimportant, and except the function of running in the engine, so that it could be turned over or started easily in the road test. This being the case, the department set aside in most factories is a dark room, poorly kept and lacking in attention in every way; not only is it disgusting to the visitors to go into such a department, but to the workmen as well, with the result that the general contrast between this department and the other departments makes the men feel that they are of less importance to the concern.

Thomas Engine Testing Department from East, Showing "Little Six" in the Foreground

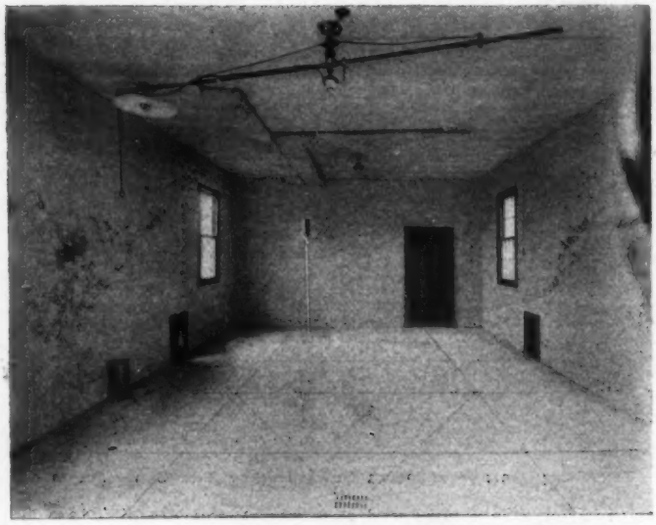
It was early realized by the Thomas company that the dormant opportunities of well-kept and carefully managed departments invariably yield in return a more finished output. Their designers visited the different factories in the United States for the purpose of inspecting and acquiring all the good points and means of eliminating their bad points. The result is that the motor-testing building is modern in every particular. Visitors are impressed upon entering this department with the large amount of light, the general cleanliness of the floor, and the alert activity of the men, so that it is possible to regard this department as a laboratory where the design of the engineering department and the practice of the shop come together for a test of practical use. For instance we might regard the twenty units or blocks as twenty individual power plants, each of which is to be brought to its highest working efficiency before it is turned over to users; each one is treated in a similar way, so that any change in the general performance is easily noted by its contrast. This is of the greatest benefit, not only to the engineering department, but to the customer, for it implies a concentrated attention to every detail, no matter how small, is seldom found.

Before the engine is allowed to go to the brake test it is brought into the department and thoroughly inspected, then it is "run in" for a period of five hours to determine if the assembling has been correct, and also to limber the engine preparatory to runnning under its own power. The engine is then run under for a period of 50 hours, after which it is "torn down."

Each motor is mounted on a heavy framework, cast iron and steel, in such a maner that every part is accessible and easily observed. The water and gas connections are attached in exactly the same manner as they are on the cars, so that as far as possible the performance of this same motor can be interpreted upon the road before it is assembled in the chassis. The water, for instance, as it leaves the motor is at all times observed; in this way it can be told whether a motor is overheating or requiring an excessive amount of water to keep it cool. Directly connected to each motor, and in the same frame, is a hydraulic testing dynamometer or brake so regulated that any desired load can be "thrown upon" the motor. Starting at a low speed and going up to 1,500 revolutions per minute, the horsepower is noted, and the "characteristic" curve plotted from this data. These curves are plotted upon regular cross-section paper, with the average performance, so if the motor falls below the average performance, it is instantly detected, and either is tuned up during the test or entirely gone over at a later time.

The character of the assembly work and all of the parts are inspected and defective ones are immediately replaced. After the engine has been assembled it is run-in for a period of five hours and then put on its severe brake test. It is then rigidly inspected by a man not connected with the department—one that has an unbiased opinion as to the finished product. No engine can go out of the department until it develops the horsepower specified at all speeds by the engineering department. The cards that contain this data are at all times kept on record and open for inspection by all interested customers of the concern.

Testing Room from West, Displaying Large Number of "Fours" Under Test at One Time



Interior of Garage Part of Hollow Tile Building

also very commodious. This is the Morris garage at Westchester, N. Y., and is built of hollow terra cotta tile, covered with cement. The construction, in fact the tile themselves, may be seen in the picture of the inside shown elsewhere on this page.

These are set up on edge, so that the hollow or hole through the base layer carries clear up to the top. The ceiling, in this case also the floor for the second story, is made up in the same way, except that the tile are laid flat so that the interior holes progress across the building. The floor tile are laid between reinforced concrete beams, which form the supports. If desired, the supports could have been structural steel, either I-beams or channels, or wooden beams might even have been used. The latter would have the advantage of giving a good foundation to which to attach floors or ceilings of wood, but this would be completely overbalanced by the fact that their use would detract from the fireproof qualities of the structure.

In the foreground may be noticed the drain for the washstand, the interior of the garage at the time this picture was taken being bare just as the builder left it, and before it had been occupied by either the chauffeur or the car.

**Terra Cotta Garage in Process of Construction**—The two illustrations below show a garage-stable as completed and when but partly completed, a before and after effect. In the left hand picture the building is about half finished. The tile may be seen very plainly, the lines of demarkation between each tile and its neighbor being distinct.

In the second picture is shown the garage as finished, the tiles for the roof being in place, the walls covered with the cement plaster, and the dormer windows being coated as well. This picture is not taken from the same viewpoint as the first one, as the first shows the back, while the last one shows the front of the building with the entrance at the left.

It is a wide, spacious entrance, flanked by a pair of square posts of good height. The doors and windows used carry out the scheme of the rest of the building very effectively. This structure is located at Monmouth Beach, N. J.

A record was made in its construction, ground being broken on May 9, and the building being completed on July 3. This made the elapsed time but 55 days. The tile used varied somewhat. Those for the first story, that is, up to the eaves, were 8 inches thick. All tile used above that were smaller, of but 6-inch thickness. Despite the very ornamental character of this building, and the great haste in which it was erected, the cost was very low. This amounted to but 22 1-2 cents per cubic foot of contents, that is the whole cost, divided by the number of cubic feet in the walls, etc., amounted to this figure. The roof tile are a bright red in color, and in form are the S tile. That is, the section through the tile forms an S. In assembling or laying, half of each tile overlaps the one next to it, the water and weatherproof qualities being obtained by this overlap.

**Strength of Hollow Tile for Floors**—The idea that tile has no horizontal strength is somewhat prevalent. This idea is erroneous, as will be shown. Thus, a floor system composed of hollow tile set horizontally, with a 4-inch beam of reinforced concrete between each pair of tiles, the concrete carrying varying sizes of rods and of a composition of 1 part Portland cement to 3 parts sand and 5 parts gravel, has the following strength:

**LOAD TABLE OF HOLLOW TERRA COTTA TILE FLOORS**

**Safe Live Load in Pounds per Square Foot—Factor of Safety—4**

| Span in feet | 12-in. Tile, 1-in. Rod; Dia. Weight per sq. ft. 68 lbs. | 10-in. Tile ⅞-in. Rod; Dia. Weight per sq. ft. 58 lbs. | 9-in. Tile, ⅞-in. Rod; Dia. Weight per sq. ft. 57 lbs. | 8-in. Tile, ⅞-in. Rod; Dia. Weight per sq. ft. 48 lbs. | 7-in. Tile, ¾-in. Rod; Dia. Weight per sq. ft. 43 lbs. | 6-in. Tile, ¾-in Rod; Dia. Weight per sq. ft. 38 lbs. | 5-in. Tile, ¾-in. Rod; Dia. Weight per sq. ft. 30 lbs. | 4-in. Tile, ¾-in. Rod; Dia. Weight per sq. ft. 26 lbs. |
|---|---|---|---|---|---|---|---|---|
| 5 | 2512 | 1942 | 1608 | 1377 | 934 | 692 | 477 | 294 |
| 6 | 1722 | 1327 | 1100 | 942 | 636 | 470 | 320 | 196 |
| 7 | 1247 | 962 | 796 | 680 | 456 | 334 | 230 | 137 |
| 8 | 941 | 725 | 596 | 509 | 338 | 248 | 168 | 99 |
| 9 | 729 | 559 | 461 | 392 | 258 | 188 | 127 | 73 |
| 10 | 577 | 442 | 363 | 308 | 202 | 145 | 97 | 54 |
| 11 | 466 | 355 | 291 | 227 | 158 | 113 | 75 | 40 |
| 12 | 379 | 289 | 236 | 199 | 126 | 89 | 58 | 30 |
| 13 | 313 | 238 | 193 | 163 | 101 | 70 | 45 | 21 |
| 14 | 261 | 197 | 160 | 134 | 80 | 56 | 35 | 14 |
| 15 | 218 | 164 | 132 | 110 | 65 | 43 | 26 | 9 |
| 16 | 184 | 137 | 110 | 91 | 48 | 33 | 19 | 5 |
| 17 | 155 | 115 | 92 | 75 | 41 | 25 | 14 | ... |
| 18 | 131 | 96 | 76 | 62 | 31 | 18 | 9 | ... |
| 19 | 111 | 81 | 63 | 51 | 22 | 11 | ... | ... |
| 20 | 93 | 67 | 52 | 41 | 17 | 8 | ... | ... |

For a floor of cement, 1 1-4 inch thick, laid on top of this as a finish, the size of rods is increased by 25 per cent., all other figures being the same. The strength of the floor system is then increased by about 75 per cent. above the figures given in the table above, and from that figure on upward, to as high as 160 per cent. in some cases, the exact figures not being of sufficient interest to warrant repeating the table here.

*(To be continued.)*

Hollow Tile Garage in Process of Construction

Same Garage as It Appeared When Completed

# UTILITY AND IMPORTANCE OF PROPER ENGINE TESTING

BUFFALO, N. Y., Nov. 29—The E. R. Thomas Motor Company has inaugurated a system of block testing that ranks with the best in the country. In the past, many factories have regarded the block-testing department as unimportant, and except the function of running in the engine, so that it could be turned over or started easily in the road test. This being the case, the department set aside in most factories is a dark room, poorly kept and lacking in attention in every way; not only is it disgusting to the visitors to go into such a department, but to the workmen as well, with the result that the general contrast between this department and the other departments makes the men feel that they are of less importance to the concern.

Thomas Engine Testing Department from East, Showing "Little Six" in the Foreground

It was early realized by the Thomas company that the dormant opportunities of well-kept and carefully managed departments invariably yield in return a more finished output. Their designers visited the different factories in the United States for the purpose of inspecting and acquiring all the good points and means of eliminating their bad points. The result is that the motor-testing building is modern in every particular. Visitors are impressed upon entering this department with the large amount of light, the general cleanliness of the floor, and the alert activity of the men, so that it is possible to regard this department as a laboratory where the design of the engineering department and the practice of the shop come together for a test of practical use. For instance we might regard the twenty units or blocks as twenty individual power plants, each of which is to be brought to its highest working efficiency before it is turned over to users; each one is treated in a similar way, so that any change in the general performance is easily noted by its contrast. This is of the greatest benefit, not only to the engineering department, but to the customer, for it implies a concentrated attention to every detail, no matter how small, is seldom found.

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Testing Room from West, Displaying Large Number of "Fours" Under Test at One Time

## CAR HARD TO CRANK

Editor THE AUTOMOBILE:

[2,101]—I have a 45-horsepower Lozier car which I cannot crank because of a lack of strength and which almost kills my man if he has to turn it over more than once or twice. I have written to the Lozier people about it, but they tell me that they can do nothing to help me out. Other cars (Alco and Packard) have devices that overcome this kind of trouble, and I would like to find out if any users of the Lozier cars have succeeded in getting anything that makes the car a possible car to run. Can you suggest any way for me to obtain this information?

Paterson, N. J. C. S. J.

As we have never heard of this trouble among Lozier owners or drivers previously, we cannot advise you what others have done.

Speaking generally, the reason why your car is hard to crank is because it has high compression and tight piston rings which retain the compression. Both of these are inseparable from high power and high speed. On the other hand, both of these should make starting on the spark an almost invariable performance.

In case you have not been able to start on the spark and are still unable to crank the engine readily, the thing to do is to obtain a device which will relieve the compression in part and which may be worked at starting time and then moved back so that the full compression is obtained for running. This may be effected as follows:

This engine, like every other one, must have compression relief cocks on top of the cylinders. Take out all of these, and with hack-saw or other tool cut a 1/8-in. slot about 3/8 in. deep into the handle of each one. Then drill through the slotted parts—that is, at right angles to the slot and about half way down into it—a 1-8-in. hole. Screw all cocks back into place, turning them until all slots lay parallel and in the fore and aft direction—that is, parallel to the crankshaft.

Either obtain or make a long, flat bar of steel about 1/8 in. or slightly less in thickness by 1/2 in. wide. This set into place in the slots in the cock handles, and after marking the position of the holes therein drill the four necessary holes. When the bar is put back into place, put in four 1/8-in. pins to hold it to the cock handles. This bar may be made long enough to reach through the radiator, the front end being turned down to a small enough size to pass through one of the radiator tubes in a lathe. When this has been done the protruding front end may be bent over to form a handle.

Now, what you have just done is to connect up all of the cylinder relief cocks in such a manner as to allow of relieving the compression in all four cylinders, without lifting the bonnet. To start the engine, the bar will be pulled forward slightly, thus relieving the compression in all cylinders, the amount of the motion of the bar being judged by experience, since too much movement will result in lowering the compression to such an extent that the engine will not start. Your man will soon learn how to manipulate this, notches in the bar being provided so as to insure the same amount of movement each time, so that, when the best starting position has been found, it may be kept for future use.

If desirable, a fine job may be made by adding a fancy handle at the front with a quadrant to work over, etc. This, however, would work no better than the one described.

The whole thing should be made and applied to the car by your man at an expense not to exceed $1.50.

## WHO'S THAT A'KNOCKING?

Editor THE AUTOMOBILE:

[2,102]—I have a 1910 Model T Ford, on which the valves are clean, the pistons have no carbon, the engine runs well and has plenty of power, but it has a knock that is very plain.

If I hold down the second or third vibrator of the coil the knock disappears. The engine has been taken down and crank bearings tightened. Adjusting the needle valve of the carbureter makes no difference. If you can explain this difficulty it will help me very much. A SUBSCRIBER.

Massena, Iowa.

Your description of the trouble seems to suggest its own remedy. If holding down vibrators two and three causes the knock to disappear, is it not a truism that the trouble is confined to those two? Similarly, if changes in the fuel system have no influence on the knocking, while simple changes in the ignition system remedy the objectionable feature at once, is it not plain that the trouble is not in the fuel, but in the ignition system?

With this to start with—trouble confined to ignition of second and third cylinders—it ought not to take you very long to find it and fix the trouble.

Now, pounding or knocking may be caused by uncertain ignition. This in turn may be a weak coil, a loose connection, or a short circuit in the coil due to oil or water. The first may be proven by borrowing a coil for a long enough time to try if the knock will cease. The second may be found by inspection, and seems unlikely. The third and last can be remedied by taking out the sections which give trouble (two and three), drying them in an oven or over a radiator, care being used to have a very slow, gradual heating process, which will not harm the delicate coil. As far as the weakened action of the coil, the first named trouble, is concerned, you might try new springs for the tremblers on cylinders two and three, the offending ones. The simple expedient suggested of borrowing a friend's coil long enough to test it will show you quickly if the coil is at fault. If you find this to be the case, and cannot fix it, a new coil will soon put you right.

## GENERATOR COOLING

Editor THE AUTOMOBILE:

[2,103]—Will you please answer the following questions through your valuable department, "Letters Interesting, Answered and Discussed"?

1. Will wood alcohol mixed with water be safe to use in a carbide light plant, or is there any other cheap mixture which could be used in the Winter?

2. Would filling the water jacket of the carbide chamber with wood alcohol be of any benefit in cold, freezing weather?

I would gladly receive any other suggestions relative to the prevention of freezing in this system of lighting.

Bagley, Iowa. R. J. NAYLOR.

Both systems of preventing the freezing up of the carbide generator could be used to good effect. The method of putting the anti-freeze in the water jacket seems more reasonable than the other way, although as described by an old subscriber elsewhere in this issue (letter 2,108), this method is very effective, and, if anything, seems to improve the light obtained rather than the contrary, as one would think.

If you wanted to use the anti-freeze in the water jackets instead of inside of the generator, a cheaper mixture than alcohol could be made, using common salt, with which a temperature of minus 5 deg. may be maintained without the mixture sensibly thickening. If your part of the country is not subject to long spells of cold weather, in which the temperature goes below minus 10 deg. Fahr., this salt mixture would certainly be as useful as any other, and infinitely cheaper.

## STORAGE BATTERY FREEZING

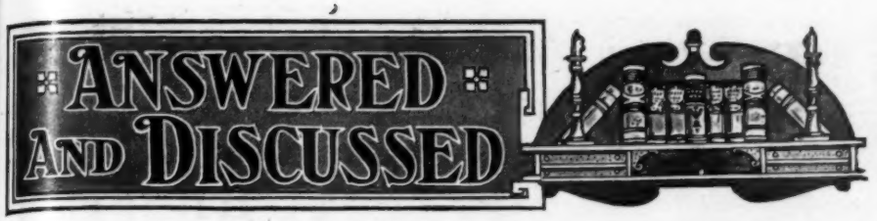
Editor THE AUTOMOBILE:

[2,104]—Will you please advise me through the columns of "Letters Interesting, Answered and Discussed," at what temperature the electrolyte of a storage battery will freeze, also the time required?

CECIL E. PATTERSON.

St. Marys, Ont.

This is a trouble of which we have never heard, from which we are forced to conclude that at any ordinary temperature the liquid of a storage cell is practically unfreezable. More than this, your question is too indefinite. Electrolytes are of differing densities, one at charging, another at discharge, and still others without number in between. At every different density, the freezing temperature (if there is one) and the time required would be different. So, even if we were able to answer your question by means of exact figures, a very long table would be necessary in order to give all of the possible densities to be met with in storage battery work. The average temperature of charging runs from 100 deg. F. on up, according to the speed of charging and the condition of the battery and acid at that time.




## BLOWING HIS OWN HORN

Editor THE AUTOMOBILE:

[2,105]—I have a Ford 15-horsepower runabout and wish to blow the horn on the same by compressed air. Could I have a tank, about 12 in. by 6 in., placed somewhere on the machine, with a pipe leading from, say, the rear cylinder to the tank. I would put a check valve in the pipe and tap into the exhaust valve cap for my supply. When the engine is running gas would be forced through the pipe and into the tank. When the pressure there was equal to the pressure in the cylinder at the time of explosion no action would take place. The gas could not leave the tank on account of the check valve.

Could I use this same tank of gas to inflate tires? Please answer through "Letters Interesting, Answered and Discussed."

Warren, Mass. LOWELL S. ELLIS.

The answer to your questions is yes to both. The tank could be rigged up as you suggest, but it would be advisable to use a much larger tank, say, about 12 in. by 24 in. This gas could be used for pumping the tires as well as for blowing the horn. But the action of exhaust gases or even highly compressed unburned gases from the cylinder previous to explosion upon the rubber composing the tires has not yet been fully explained. As you will find by referring to the files of THE AUTOMOBILE for last Spring, when this subject was discussed, this is open to argument. Some claimed that the cool, moist gases previous to explosion were beneficial to the rubber, while others said that it was impossible to do this without getting some gasoline either as a liquid or as a vapor into the gases. Gasoline is well known as a solvent for rubber.

You would find the attachment of this tank well worth your while, as the compressed gases could be used for many purposes, even to the starting of the engine. The latter, however, would call for a timing apparatus which would have to be driven off of the engine, and so might result in more complication than you would care for, having a small and easily started engine.

## TWO-BEARING ALIGNMENT

Editor THE AUTOMOBILE:

[2,106]—On a number of cars brought out this past season the motor is fitted with a two-bearing crankshaft, fitted with plain bearings. Is it not a fact that a shaft having but two bearings, and plain bearings at that, will, sooner or later, be thrown out of alignment? GEORGE CHRISTMAN, JR.

Spring Lake, Mich.

Nearly all of the very small engines cast in a block—that is, the four cylinders in one casting—have the two-bearing shaft. However, most of them use ball-bearings. The argument in favor of this practice is that the elimination of the middle bearing shortens the length or distance between the end bearings by a very large amount, varying upward from 2 1/2 in. This shortened shaft is then stiffer because of the decreased length between supports, while the majority of builders go farther and make the two-bearing shaft of larger diameter throughout. This also adds to the stiffnesss and reduces the liability to bending or to lack of alignment.

Now, with ball-bearings the two end supports give the shaft but point contact—that is, it is supported upon two points, one at each end. In case anything should tend to throw the shaft out, or in case of excessive strains tending to bend the shaft, the point support would allow the shaft to vary slightly, which would not be the case with plain bearings. The latter would grip the shaft for a distance equal to their length, preventing any variation at that point. Strains set up in the shaft then, in the case of the plain bearings, would result in actual shearing off, or, in a milder case, in the bending of the shaft.

This being the case, then, the only resort for the makers using the plain bearings is the enlargement of the diameter to such a size that bending is impossible. In case this is not done, or if the shaft is of small diameter, the buyer should be careful. There is a certain relation between the diameter of the cylinders, or power, if you prefer, and the section of the crankshaft, the strength of the material being known. Knowing this relation for a successful and perfectly safe motor with three or more bearings, you should add to the factor of safety a certain amount for the two-bearing shaft. This, then, would give a size for the two-bearing shaft which, in the absence of definite knowledge, might be considered safe. In that case it would not be advisable to buy an engine with a shaft smaller than the one decided upon as safe.

In weighing the merits and demerits of the two-bearing crankshaft, you should take into account the fact that length means weight, so that every inch saved—and this construction saves upward of five—means many pounds weight eliminated. This saving in weight is taken off the tires. As a result, the tire expense is lessened. Since this is by far the largest factor in the cost of upkeep, the latter is materially reduced. More than this, less weight with the same power spells either greater speed or improved gasoline economy. In this latter, you must take your choice, for you can not have both.

This weight saving, for instance, carries farther than one would think. Thus, not only does the cylinder casting itself weigh less, but also the exhaust pipe, inlet pipe, both inlet and outlet water pipe, crankcase, and many others.

## PNEUMATICS FOR SOLIDS

Editor THE AUTOMOBILE:

[2,107]—The solid rubber-tired wheels of my 16-horsepower automobile are 34 inches in diameter. The felloes are 1 1-2 by 1 1-2 inches (not counting iron and rubber). Hubs are artillery, 16 spokes. Would it be possible to remodel them so as to use a 36 by 3 pneumatic tire? Would this affect the running? The machine is friction-drive, side chains, sprockets 8 and 52 teeth, and capable of 30 miles an hour.

Ruston, La. B. F. DUDLEY.

The change should considerably improve the riding qualities of your car, as it is bad designing to use solid tires of the ordinary type on wheels as small as 34 inches. Further, we believe the change would be thoroughly practical. A 36 by 3 pneumatic goes on a felloe 29 11-16 inches in diameter, not counting the rim. You do not say how thick your present solid tires are, nor how large is the diameter of the felloe, but it should be approximately that figure. A 36 by 3 1-2 pneumatic requires a 28 11-16-inch felloe. We would recommend the 3 1-2- inch size if your wheels will permit the use of it, unless the car is very light.

The difference in gearing due to the use of 36-inch wheels instead of 34-inch would be very slight; it would be higher in the ratio of 34 to 36. That is, with your car geared at present for 30 miles an hour, the change would gear it for slightly less than 32 miles. If you have hills or soft roads in your vicinity which would make this gearing too high, you might change the rear sprockets to, say, 55 teeth.

Larger sizes than 36 inch would be special and require a special wheel, in all probability. The last-named change, from a 52 to a 55-tooth rear sprocket, keeps the speed the same as at present with 36-inch tires.

## ANTI-FREEZE CAN BE USED

Editor THE AUTOMOBILE:

[2,108]—I note that in your answer to Letter No. 2,083 asking for an anti-freeze solution for generators, you say there is nothing which can be used for the upper tank. The writer has used as high as 40 per cent. wood alcohol solution without apparent effect on his lights. If anything, they seemed somewhat improved. Enough water will flow to make gas, and the alcohol is vaporized by the heat, and burns.

With regard to anti-freeze for the radiator, the writer used a 50 per cent. glycerine solution ten years ago on a one-lung Winton, and has used it ever since on a dozen cars, with thermo-syphon circulation and all kinds of pumps. The strength of the solution has been gradually reduced, on account of expense, to 25 per cent., which in this climate is enough. A little slush will form at temperatures near zero, but it will go through the pump readily, and never cause any trouble. If it harms rubber, as it is reputed to do, it is not noticeable in a season's use.

One year a ready-made and widely advertised solution was used which ate out all the aluminum it touched (name forgotten). The alcohol and alcohol glycerine solutions were tried, but were found to boil too easily, and to seek out the smallest leak, while the glycerine forms a jelly when exposed to the air and will actually stop small leaks.

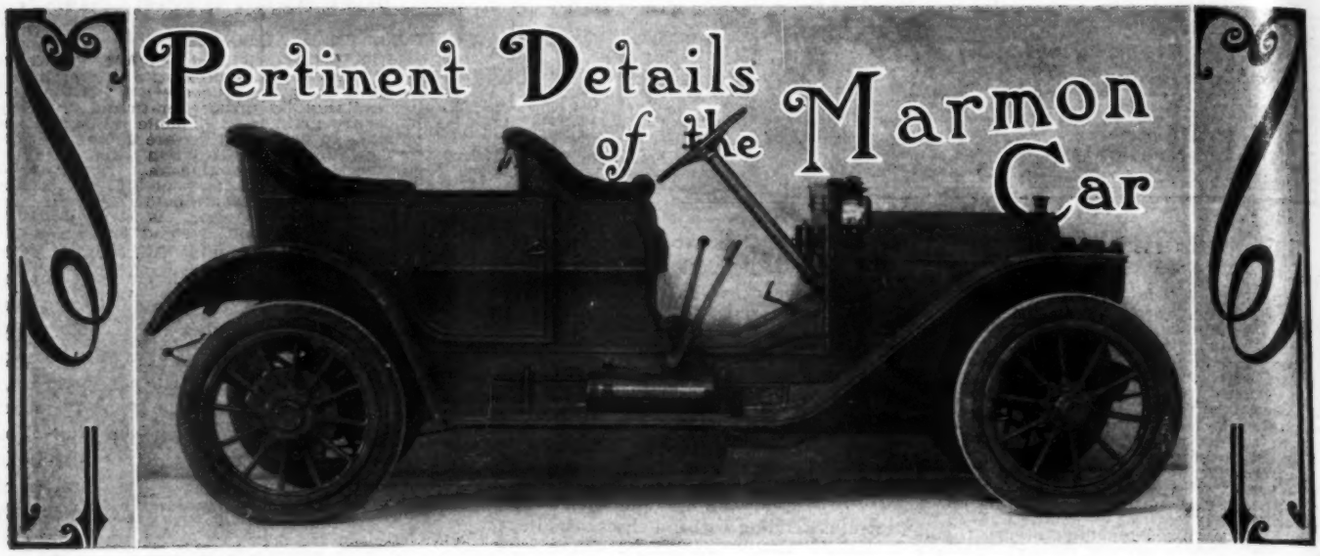
The writer's experience with glycerine has been so wide and so satisfactory that he would not hesitate to say that it is absolutely satisfacory for any case.

For the benefit of our friend who wants names, it has been used by the writer and his friends on a 1900 Winton, 1903 Olds, 1904 Cadillac, 1906 and 1909 Gaeth, 1908 Garford "30." 1908 Ford, and 1907 Packard.

AN OLD TIMER.

Cleveland.

# Pertinent Details of the Marmon Car



Marmon "Thirty-Two" Suburban Touring Car, with New Four-Passenger, Short-Coupled Body

FROM the year 1851 down to the present time the Nordyke & Marmon Company, at Indianapolis, Ind., has been practising up for what would now seem to be an absolutely standard effort, as represented in the Model Thirty-Two car for 1910, and while it is not the purpose here to claim that the automobile has been on the tapis all these years, even so, the plant has been devoted to a refined class of work, and "micrometer rule" has dominated the situation from the very inception.

When the company added an automobile department to its large plant it went into the matter rather cautiously, and by dint of a good deal of preliminary engineering work evaded many of the pitfalls of other pioneers. The result is that the present car, while it is up to date in every particular, is not so different from the last year's model as might have been supposed, which is another way of indicating that a standard product changes with the standard, and while there are many who fail to appreciate that standards do change, the fact remains.

Model Thirty-Two, which is the Marmon chassis for 1910, has a little longer wheelbase than last year's car, and the motor is suspended by a separable (flanged and bolted on) arm at the end of the crankcase, between it and the flywheel. The arm, as secured into place, takes the flywheel gyrations more perfectly, and the facility of a three-point suspension adds to the value of this method. As a further advance with the standard, the steering linkages at the front axle are so nested that they are out of harm's way. Some advances in material and methods of treatment have also been made.

The product of this well-known plant for many years was mill machinery, and long before the automobile was a noticeable factor in industrial life the company used micrometers instead of carpenters' rules, jigs instead of approximations, and system became a habit.

**Some Technical Features Taken at Random**—The scheme of design is outlined in Figs. 1 and 2 of the chassis, in side elevation and plan, respectively. While the specifications cover all that the chassis drawings depict, even so there are certain accentuated points in design that greet the eye and demand further recognition. The drop frame F, of the channel section, is 4 1-2 inches deep, gives good clearance at the axles, especially at the rear, where the motion is the most pronounced, it being fully 4 inches at C, Fig. 1, between the underside of the frame and the top of the bumper; the give of the bumper B adds to the clearance. The rear spring suspension, S, is full elliptic, 42 x 2 inches, which is indicative of easy riding qualities, and the material used is claimed to be superior for the purpose.

The four-cylinder, water-cooled motor M is provided with a high raiser, R1 and R2, with a flexible connection, H1, between the two pairs of cylinders and H2 from the front pair of cylin-

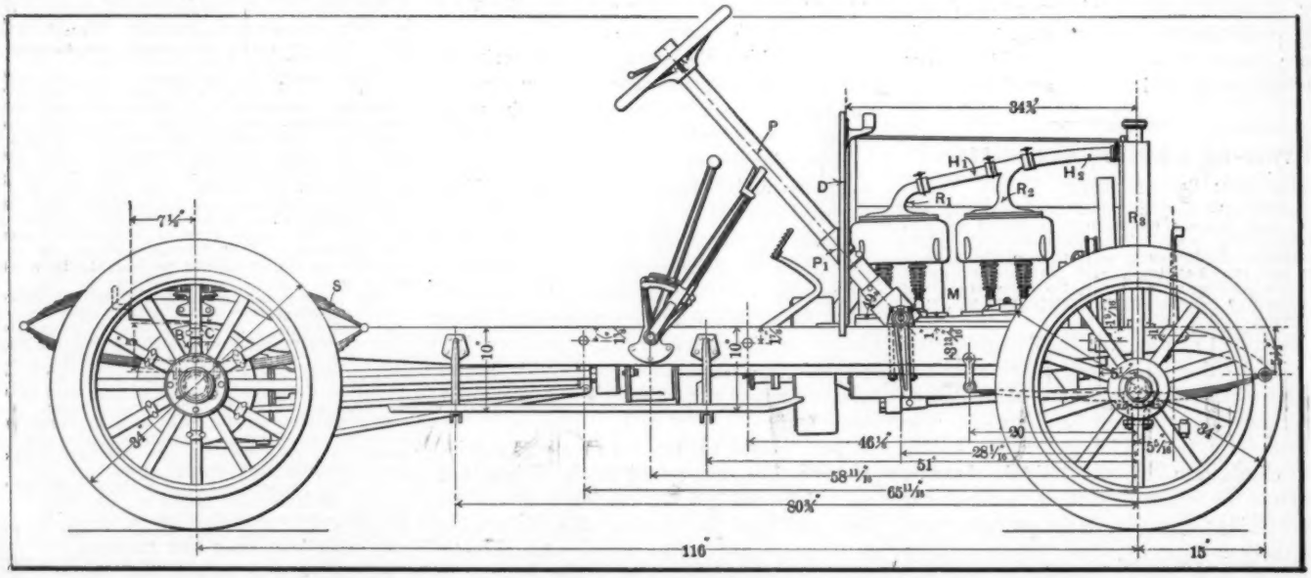



Fig. 1—Side elevation of chassis, showing position of motor, radiator on center line of front axle and drop frame suspended on full elliptic rear, and semi-elliptic front springs

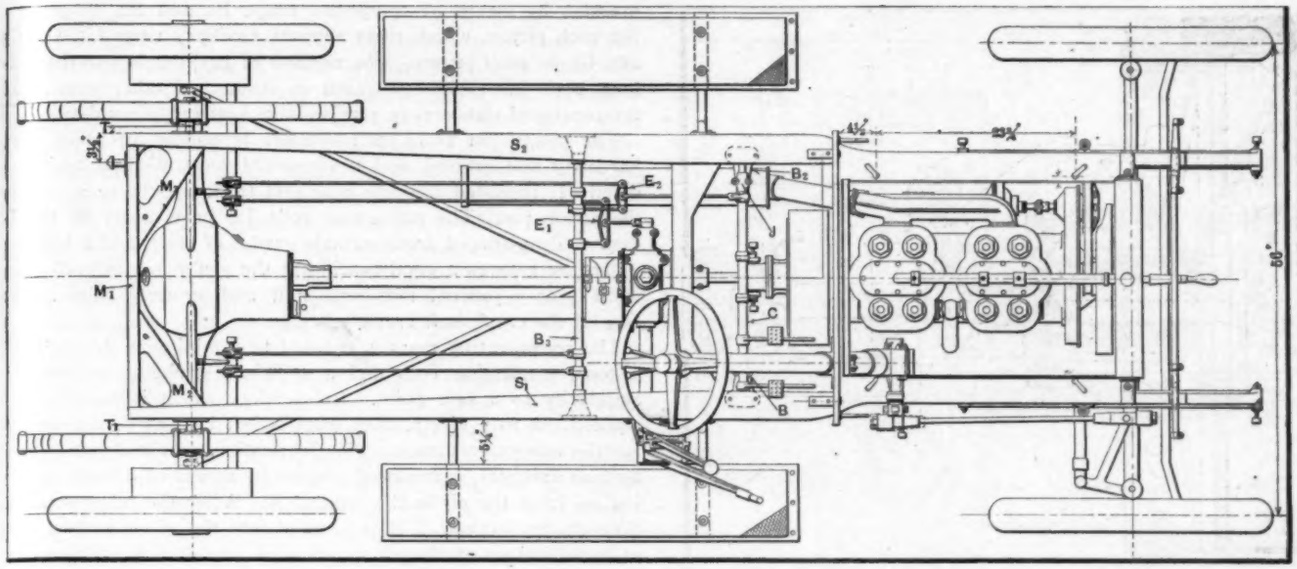



**Fig. 2—Plan of chassis, offering evidence of strength and stability, with widened flanges of side members at point of narrowing**

ders to the radiator, R3. The radiator is in a line above the front axle, and the over all distance from the center line of the front wheel to the front edge of the mahogany dash D is 34 3-4 inches, which length is enough to balance the general appearance of the car. The steering column, P, is securely braced at the point where it passes through the dash D, and held in secure relation by means of a plate P1.

The plan of the chassis presents evidences of strength, as, for illustration, the flanges of the side members S1 and S2 are widened as the dash is approached, and where the frames are narrowed in, supports are close at hand to tie up the work. The clutch shaft C passes clear across, and the brackets B1 and B2 are securely riveted to the frame, while the journals, one of which shows as J, are long and well fitted. What is true of the clutch shaft C is also to be said for the brake shaft B3, and in the same figure the equalizers for the brakes, at E1 and E2, will be easier to discern than in any other view available. The rear cross member, M1, is provided with unusually liberal corner braces, M2 and M3, and the rear spring trunions, T1 and T2, are provided with wide flanges and securely riveted to side-frames.

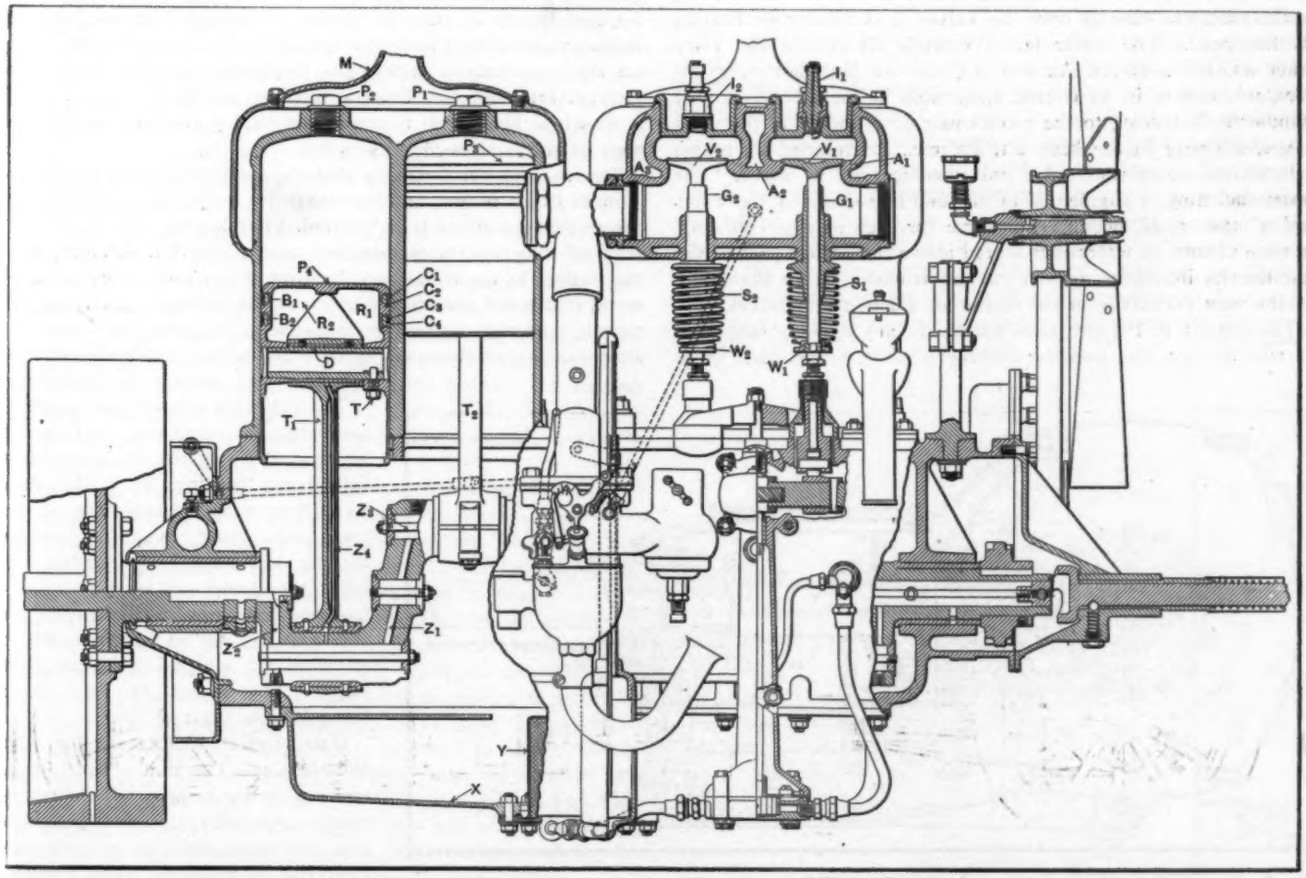



**Fig. 3—Right side of the motor, in part section, disclosing light reciprocating parts, a competent oiling system, and nice details**

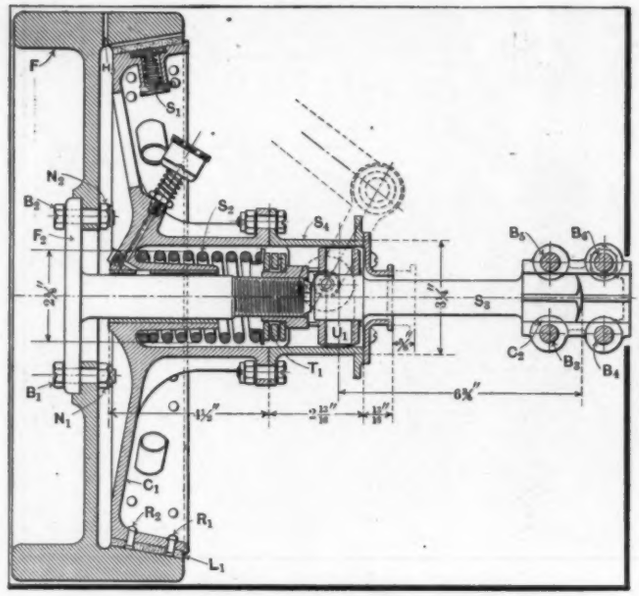



Fig. 4—Section of flywheel and cone clutch, presenting such details as mushrooms with springs behind them to press leather facing out, etc.

**Refinements in Design of the Motor**—Referring to Fig. 3, of the motor, looking at the intake side, which is the right-hand side when the motor is in place in the chassis, the front pair of cylinders is shown in part section cutting through the intake valves V1 and V2. The valves run in sized guides, G1, G2, etc., and the valve springs S1, S2, etc., press against a flange turned on the guides G1, G2, etc., while the other ends of the springs rest on a concentric support, washer-like, W1, W2, etc.

The spark plugs, 11, 12, etc.. of which there are four on the intake side, are directly over the valves, and sooting or heating is eliminated. The water jacket extends all around the valve seats, as shown at A1, A2 and A3, for the first pair of cylinders, which plan is, of course, duplicated in the second pair of cylinders. Referring to the second pair of cylinders in the same figure, the plug in the head P1, P2, etc., is threaded in, passes through the inner wall only, and is submerged in water. The water jacketing is augmented by the bell-like shape of the water piping makeup, M, which is the same for each pair of cylinders, and the volume of water thus stored above the hottest part of the cylinders is insurance against cooling trouble. More than that, it aids very materially in the matter of efficient lubrication.

The pistons P, P1, etc., have flat heads, are strongly supported by ribs R1, R2, etc., and the packing is done, to maintain compression by means of compound rings, B1 and B2, in grooves for each piston, which rings support auxiliary rings C1, C2, C3 and C4 on each piston. The method of packing is one that has long been favorably considered in steam and other work, and the continued tightness in service is its best recommendation.

The piston pin D in each cylinder is hollow, of alloy steel, hardened and ground, and is prevented from floating by a cap screw, T, threaded into the boss and turned to fit in a hole in the piston pin. The connecting rods J1, J2, etc., are of the I-section, drop-forged from suitable grades of steel, and a bushing of bronze assures a good bearing at the piston pin in each case, while proper journal members, split and securely bolted, take care of the crankshaft crank bearings.

The reciprocating mass is reduced to a minimum, due to light pistons, connecting rods and a sufficient stroke to reduce the angularity to a safe point. Lubrication, which is positive and worked out to a nicety, does what is left by way of accounting for the fine performance. This lubrication, as the design reproduction indicates, is rendered positive by means of oilways reaching up from the oil in the "sump" X. After the oil is strained through the strainer Y it is pumped into the oiling system, and as an indication of the means afforded, attention is called to the oilways in the crankshaft Z1, Z2 and Z3, also in the connecting rod Z4, leading up to the piston pin.

Before departing from the discussion of the motor as suggested by Fig. 3, a glance at the fan detail, at the front, will disclose a point or two: The fan is large, is driven by a wide, flat belt, and the bearings are lubricated by a greasecup pressing hard lubricant in through the passageway Z5. The fan support is strong and is to the crankcase. There are additional details, to be sure, but enough has been said to enable the reader to take up the burden.

**Simplicity Resides in the Clutching Mechanism**—Fig. 4 refers to the flywheel F1, made of selected gray iron, cast in the Marmon foundry, at the plant where the cars are made, and instead of keying on, the flywheel is flanged to the crankshaft at F2, and is held in place by means of through bolts B1, B2, etc., with nuts castellated and locked, N1, N2, etc., by cotter pins. Any oil that accumulates within the flywheel is driven out by centrifugal force through holes around the periphery, one of which is shown at H1. This is a very practical preventive against that bogy of the novice, clutch slipping.

The cone clutch C1 has a dished spider, as shown in section, is made of aluminum, and because of its shape, all internal strains are removed and safety is assured. The leather face L1 is of a selected variety of clutch-leather, and rivets R1, R2, etc., hold the leather to the cone-face. Leather, when used in cone clutch work, if it is not pressed out by means of springs, is likely to give trouble, and the practice in this case is to cause the leather to press out by placing coil springs S1 behind mushroom-shaped members M1 around the periphery.

The clutch is pressed into engagement by the concentric coil spring S2, and the reaction is taken by a ball thrust bearing, T1. The shell S4 is flanged to the extension of the cone-spider just over the thrust bearing, and a universal member, U1, takes the power on its way to the live rear axle, passing it through the stubshaft S3 to an accommodation coupling, C2, which is split and held together by means of four large bolts, B3, B4, B5 and B6.

**Unit System Obtains for the Whole Car**—The motor and clutch, making up one unit, leaves the transmission, attached to the live rear axle, as the second unit, and the section, Fig. 5, which is taken through the propeller shaft center, will show

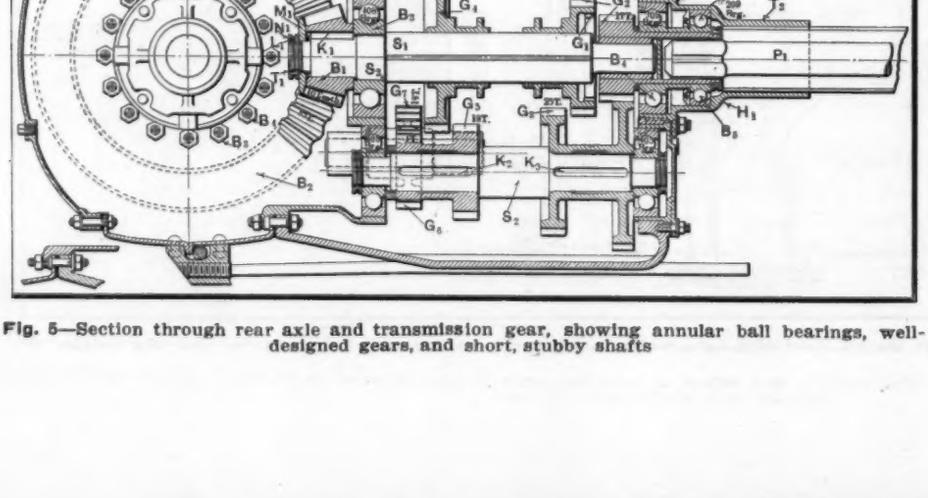



Fig. 5—Section through rear axle and transmission gear, showing annular ball bearings, well-designed gears, and short, stubby shafts

enough of this system to bring out the points to be made plain.

The transmission gear is of the selective type, with three forward speeds and reverse, and direct drive on high speed is brought about by sliding the internal gear G1 into mesh with the teeth of the pinion G2. Hill-climbing gear is let in by meshing the external teeth of G1 with the teeth of G3, when the gear ratio is unity, due to the fact that both gears have the same number of teeth; this leaves the bevel drive as the only means of gear reduction in intermediate speed, which reduction is that due to 53 teeth in the bevel gear and 16 teeth on the mating pinion, and 53/16 = 3.31. Low gear, used for accelerating, is let in by meshing G4 with G5, and the reverse requires that G6 and G7 engage with G4.

The bevel drive, involving B1 and B2, with the latter flanged to the differential housing by bolts B3, B4, etc., is held in rigid relation by the large diameter shaft S1 and the large annular ball bearing B3, which is a sucking fit, and presses against the shoulder S2, is held on by pressure of the bevel pinion B1, and the end of the shaft is threaded, T1, so that the nut N1 is screwed up against the washer W1, locking the whole system in place. The pinion is prevented from turning by a key, K1, and the nut N1 is locked on by means of a wire in a groove, L1.

The lay shaft S2 is of large diameter, relatively short, hence rigid in the extreme. The gears are keyed on at K2 and K3, are of hardened special steel and of a shape to resist deformation in the process. The prime shaft S3 is a square, and the sliding gears are, like the fixed gears, hardened and of a shape to stay put. At the telescoping joint the gear G2 serves as a sleeve, and annular ball bearings B4 and B5 carry the load. Dirt is excluded by means of the housing H1, which engages the torsion tube T2, which is in concentric relation with the propeller shaft P1, and encloses it completely.

**Novelty and the Rear Axle are Companions**—The jack shaft S1 is flanged at its end F1, and a supplementary flange, F2, bolted to the flange of the jack shaft, is faced off and fits against a face on the hub member, H1, of the rear wheel on each side of the car. The hub H1 is bored out to take a single annular ball bearing, B1, and this bearing, while it does all the work, is dead on the center line of the wheel, so that it is in a position to assume all the responsibility. The ball bearing is a sucking fit on the reduced diameter of the bronze sleeve S2, and this sleeve fits over the drawn steel tube T1, which is concentric with the jack shaft.

The ball bearing is held securely in place in the most approved manner by means of a locked threaded shell, S3, and the jack shaft, which is of the semi-floating type, is prevented from floating off by the interference of the petticoat P1 of the hub member H1, acting in conjunction with the flanges F1 and F2, they, in turn, being secured in place by means of the hub flange bolts B1, B2, etc., and the rivets R1, R2, etc. The hub cap C1 fits over the flange F2, and is held in place by cap nuts N1, N2, N3, etc., and the appearance of the wheel is somewhat unusual, due to the elimination of the conventional hub.

The brake drum D1 is fastened to the spokes S3, S4, etc., and the drum, while it is of unusual diameter, is also very wide, there being room, side by side, for the two sets of brake shoes S5 and S6. The shoes are faced with asbestos fabric, F3 and F4, which is heatproof and possesses a high coefficient of friction. The shoes are prevented from dragging by the springs S7 and S8, and when it is desired to apply the brakes it requires but a torsional effort on the brakeshaft S9 or the concentric tube T2 for the other set of brakes; this torsion, applied to either set of members, will actuate the respective cams C2 or C3, expanding the bands and applying the necessary pressure to arrest the motion of the car. The brakes are powerful, and, all told, the area of contact of brake shoes is close to 352 square inches, and while the area of surface is not the main factor when effectiveness of brakes is to be determined, it is true, nevertheless, that the life of the brakes will depend upon this area of shoe contact.

**Objects Attained in Complete Design**—Passing to the front axle, which is of the I-section, with Timken roller bearings, it

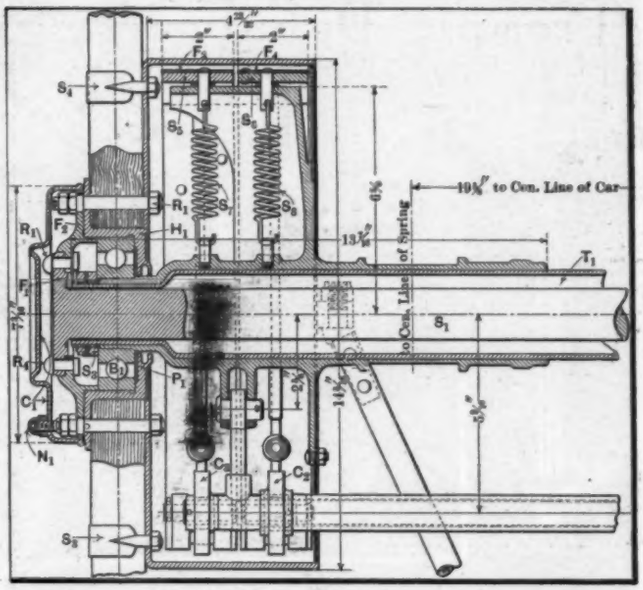



Fig. 6—Section through rear wheel, depicting a single annular ball bearing in the center line of the spokes to take the load, and means for locking at every point

is at once apparent, even without illustrating the axle, that the designer took account of the enormous side strains to be encountered, and what was regarded as perfectly suited for rear axle work was not necessarily in keeping with the requirements as they have to be met in steering road wheel work. This close study of the several parts and units throughout the car is one of the features to be noticed, and it is believed that the car has been sufficiently illustrated in detail to render the whole situation patent.

In conclusion perhaps it will be timely to say a word for standardization, especially of the steering gear, spark advance mechanism, throttle control, foot pedals and side levers of cars. Perhaps it is too much of a subject to ramble into; let it simmer, then, with the simple illustration of how the Marmon spark and throttle lever mechanism is placed on the top of the steering wheel; not without calling attention to the use of a 17-inch diameter wheel. Sitting in the seat, the spark lever is on the right side, and to advance the spark it is necessary to advance the lever. What can be more simple or natural? Likewise, the throttle control, which is on the left-hand side; to advance the throttle it is necessary to advance the lever; advancing the throttle is equal to giving the motor more gas.

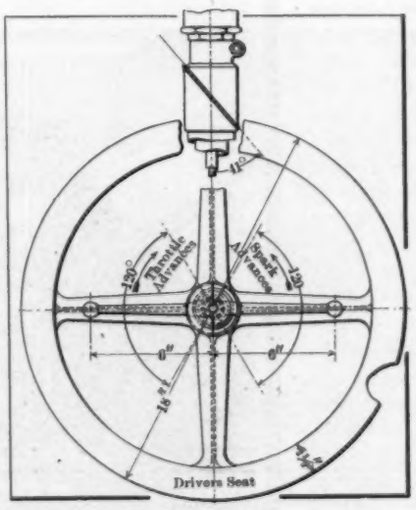



Fig. 7—Plan of steering wheel, with spark lever on right, and throttle on left side, and logical methods of control

# Prompt Debut of the Parry

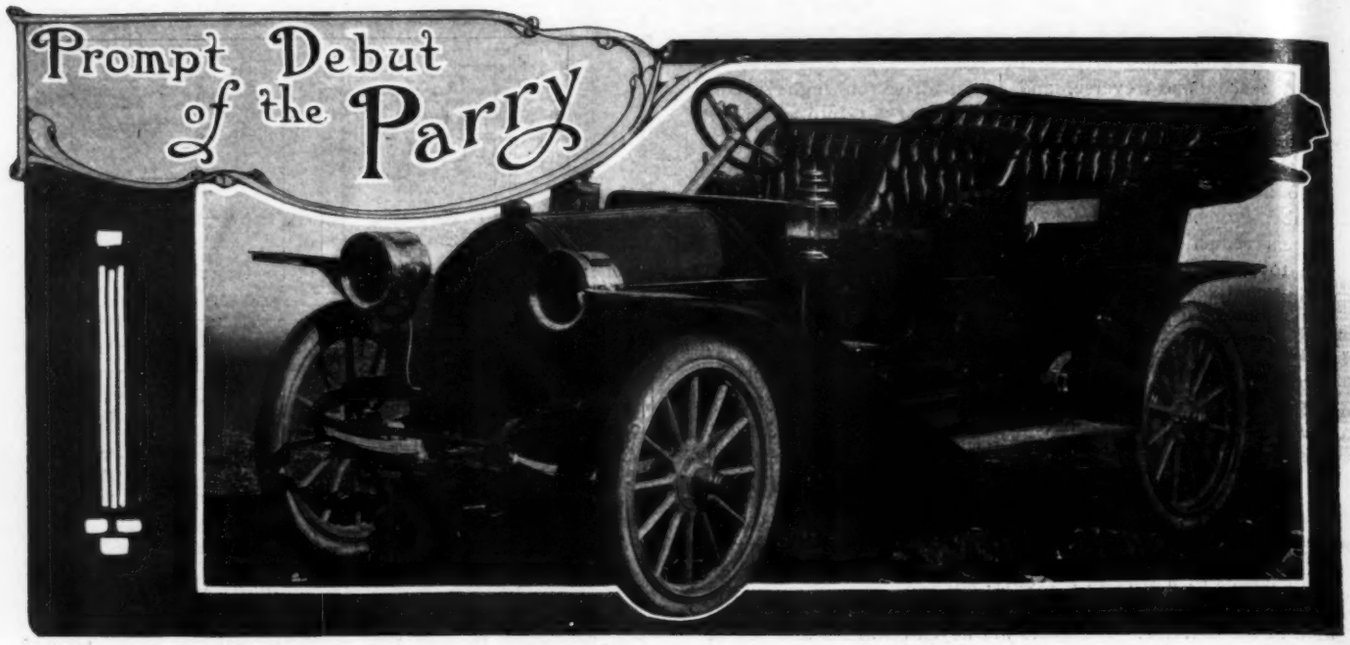


Fig. 1—Touring car for five passengers, ample power, m. b. leather upholstery, carriage finish, and easy riding qualities

THE dawn of another day is but the rhythmic repetition of a normal expectation, but the dawn of another automobile manufacturer is quite another matter; the one is bereft of novelty because it is reoccurring and always the same, while the other is all novelty, due to the ambitious advance over the last effort and the certainty with which a host of uncertainties are mastered.

It is not believed that anyone, even engaged in building automobiles, can reach a fair understanding of the vastness of the automobile industry without spending months, continuously, in quest of information, and in painstaking research, delving deep in hidden recesses, for, as experience is teaching, the largest undertakings, betimes, are hidden away, perhaps in long-abandoned factories that none would have supposed would ever again throb with human interest and bear the brunt of industrial activity on a plane as never before.

The title illustration to this story represents a car that the author had never seen before, and out of curiosity, to some extent, tracked it to its lair. Made in Indianapolis; the "Parry"; rated at 32-36 horsepower, for the motor, which is of the water-cooled type, with a bore of 4 1-4 inches and a stroke of 4 1-2 inches. The cylinders are cast in pairs, of gray iron, with valves in the head as depicted in Fig. 2, and the radiator, which is on the center line of the front axle, is so spaced as to afford room for a commodious fan, so that the air current through the radiator is adequate for the needs.

The tappet rods, for the valve-motion, run in long and well-fashioned guides, have liberal bearings where the rockers engage, and the camshaft, with integral cams, is of special steel, with "ground" cams. The flywheel is large, with an adequate flywheel effect, and the main bearing of the motor, in view of this, is of unusual projected area. The crankshaft is a die forging of "toughened" special steel, has three main bearings of die-cast white metal, and is best understood by glancing at the open crankcase with the shaft in place, as shown in Fig. 3, which also tells that the lower half is not required to carry any of the crankshaft load, since journal caps are used instead.

The half-time gears are housed in, are accurately cut, set to run on the pitch line and are noiseless. Ignition is by means of a magneto which sets on the right side of the motor as Fig. 1 portrays, and the water pump, of the centrifugal type, is just in front of the magneto on the same side. The steering gear is fastened to the chassis frame at a point between the magneto and the water pump, and the spindle passes through the chassis frame just in front of the anchorage of the rear end of the front spring suspension.

Fig. 4 is of the front axle, and this, in conjunction with Fig. 2 is enough to clearly indicate the character of the steering equipment, taking it as a whole. The linkages and arms are of suitable grades of fabricated steel and straight-line designing is the rule. The front axle is of the I section, die forged in one piece and Elliot type of knuckles add to the line of attractions. The spring perches are integral with the axle, and half elliptic springs are made to take the constant front load.

At the rear of the chassis, owing to the variable nature of the load, the designer has taken advantage of full elliptic scroll

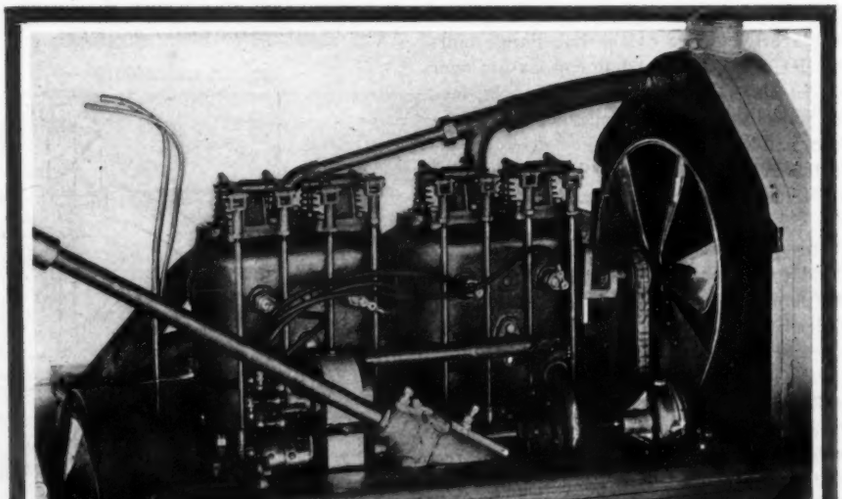


Fig. 2—Right side of the motor, showing magneto, centrifugal water pump, valves in head, well designed fan, and commodious radiator

springs, besides using an adequate volume of good material. The chassis frame is of steel, hot pressed to a channel section, and the aim has not been to skimp in material at this point; absence of castings or other heavy parts at other points has enabled the designer to see his way clear to afford a rigid chassis frame.

The rear axle, unlike the front, is clearly brought out in Fig. 5, showing a liberally designed tubular construction with a shapely bulb at the center in which the differential gear and the bevel drive is housed. The torsion tube is concentric with the propellor shaft and terminates in a universal joint at the unit transmission gear, back of the motor, resting on the chassis frame.

Referring again to Fig. 5, notice may be taken of the brakes, of which there are two sets, one of which is internal expanding and the other is external construction; both are faced with thermoid, the nature of which is such that any amount of heating such as it will get in this service fails to destroy its good working qualities. The bands are of steel, and the levers are

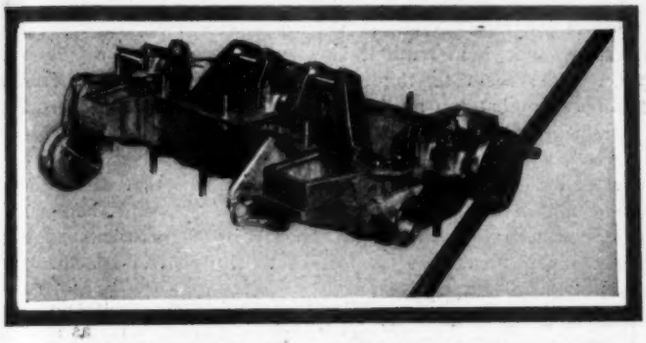


Fig. 3—Crankcase up side down, depicting crankshaft, three good bearings, and journal caps of strong design

not only of good section but they are fashioned with long bearings, and grease cups are placed at accessible points so that there is no reason why the original noiseless operation of the car may not hold out.

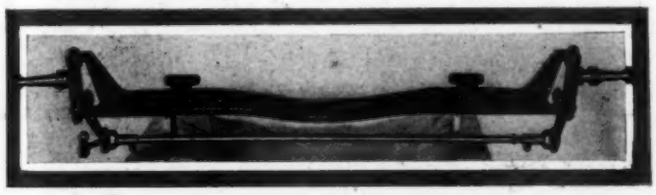


Fig. 4—Die forged I section front axle with integral spring perches, stout knuckles, straight arms and a well-designed cross-rod

Wheels are of the artillery type, made with care from second growth hickory, and the rims for the tires are quick detachable, to fit 32 x 3 1-2-tires. The tread is standard, and the wheelbase is long. There are other nice features to be noticed, as a 17-inch steering wheel, and the side levers, one of which is for the emergency brake, and the other for the three-speed (selective) transmission gear (including reverse), are shapely, strong, work with ease and precision, and are forged from a good quality of steel.

In the direction of long life and stability, there are several points that will receive the barest mention at this time; Fig. 6 showing the chassis just back of the flywheel, presents evidences of this stability. The cross member at this point is deep, and the sub-frame, which serves as a foundation for the motor, terminates at this member. All bearings and supports for the pedal and brakes fasten to substantial members, and no cantilever parts can be seen at any point, so that bending or other distortions will scarcely be a companion to the owner of such a car.

What the author found was the old Standard Wheel Company's buildings, completely filled with machinery and parts for

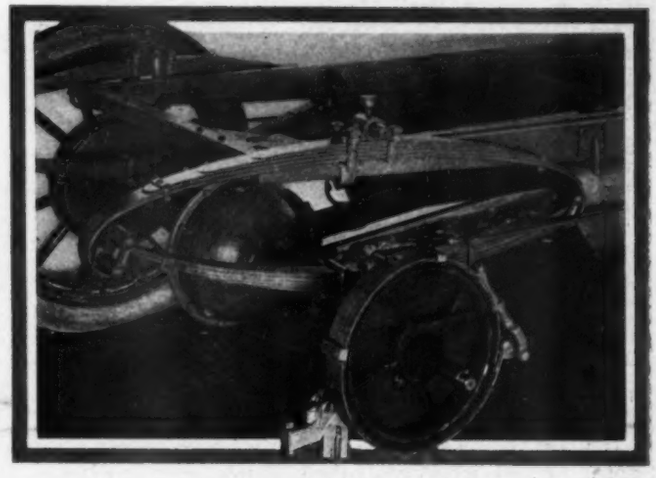


Fig. 5—Rear of chassis with one wheel removed to present brakes, live rear axle, and full-elliptic (scroll) springs

the making of automobiles, of which the above is but a brief description. Then, there are new buildings in course of erection. The new structures are of steel, and, while they look a little hasty, even so, they are of a substantial character, and the wonder is that they can be put up in such a short time. The entire time taken by this company in doing all this work, including the delivery of model cars, has happened within ninety-six days.

**Five Thousand Cars This Year**—There is every evidence that the company will put out 5,000 cars this year, which is the number that President D. M. Parry figures upon. These cars will be in two models, *i. e.*, a roadster at $1,285, and a touring car at $1,485. Just what it means to do so many things in less than one hundred days is a matter that can not easily be word pictured, and the camera was used instead, rather with the hope that it would reflect the exact situation. Fig. 7, for illustration, was taken of a big Bowser gasoline tank just rolled into the yard on a flatcar from the nearby railroad. The tank just fits comfortably on the flatcar so that it will not be necessary to describe it further. What any one would want with such a comodious gasoline tank, however, would be difficult to reason out, unless it is that the company intends to test out a considerable number of automobiles.

Magnetos are difficult to procure this year owing to the brisk demand. The Parry engineers, being alive to this situation, have them in hand, one row of which is shown in Fig. 8. In one of the new buildings the line of live rear axles tells still another tale of the early bird and the manner of building automobiles and preparing for the work at the same time; accessory makers,

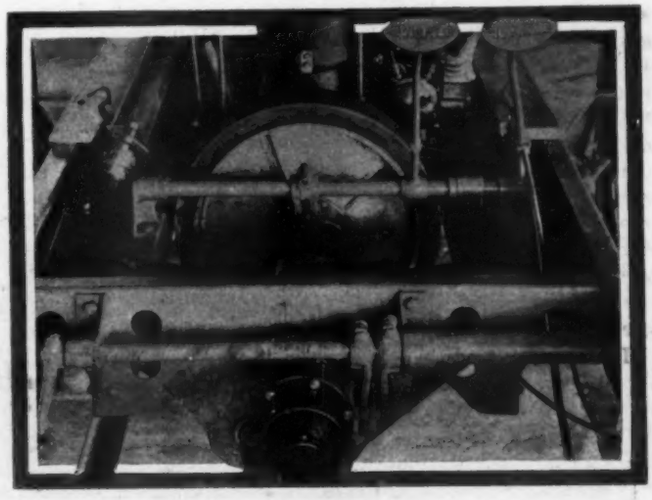


Fig. 6—Chassis just back of flywheel, presenting deep cross-member, universal joint at end of tube, termination of sub-frame, etc.

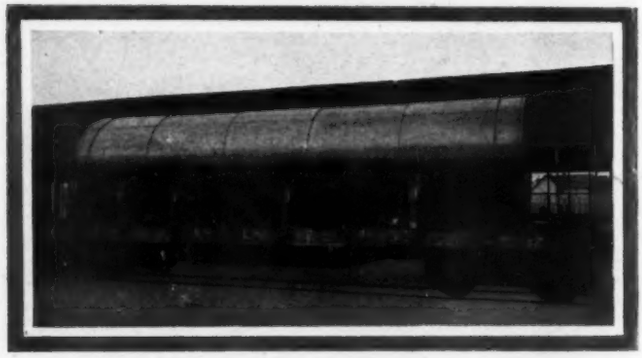


Fig. 7—A Bowser gasoline tank, on a flat car, in the yard of the Parry Auto Company at Indianapolis

it is plain to be seen, have been called upon to contribute a quota. Fig. 9 depicts one of the long rows of rear axles.

**Machining Process Catching Up Rapidly**—It might be supposed that, in a new plant such as this, assembling would be the

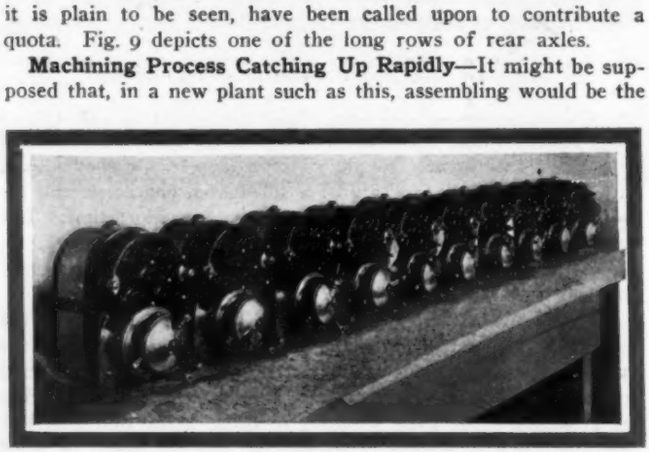


Fig. 8—Magnetos in stock awaiting the propitious time

main activity, but such is not the case. Fig. 10 is of a big new boring bar caught in the act of boring a crankcase, and this is the character of machine tools that is rapidly filling the plant.

In the forge all is activity, parts are being fashioned from bars and billets of steel, and a little to one side the frames are being riveted together. At another point, not far distant, motors are being assembled, and while the building is still ringing with the hammers of carpenters and house-smiths, the motors rapidly assume shape and the sharp exhaust reports of well-timed motors swell the din of noises that are all the more accentuated because the plant is being built and the cars are being made at the same time; what will these men do when they have but one task to perform, *i.e.*, make automobiles?

In conclusion, in view of the statements of President Parry, of the Parry Auto Company, to the author, it is inferred that the ground around the plant, of which there is enough to more than double the present situation from the point of view of

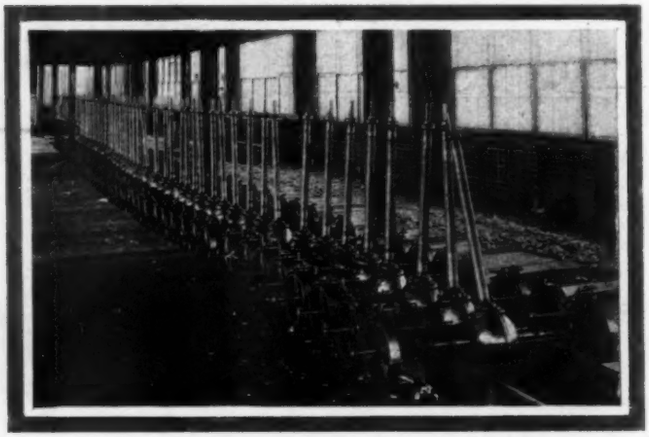


Fig. 9—Live rear axles in rows, in one of the new buildings, ready for instant use

buildings, will be covered with new buildings long before the enterprise is crystallized, and this is but one of the strong situations that center at Indianapolis, which is now an automobile center of first magnitude.

## AUTOMOBILE CREATING ITS OWN MARKET

By D. M. PARRY, President Parry Auto Company

The future of the automobile industry is to be regarded in no other than an optimistic way. In the United States in the past ten years about two and a half million vehicles per year have been sold, and a very large percentage of these vehicles will inevitably be replaced by the automobile.

Several hundred thousand machines are now in use, but this number comes nowhere near exhausting the market possibilities. For next year the estimate of production is 200,000 machines, but while this estimate should doubtless be somewhat discounted, there is no question, I think, but what the production will be larger, much larger, than ever before. The automobile means a revolution in means of transit, and this revolution is now in progress. But it cannot accomplish itself in one or two seasons, though in truth it is going forward very rapidly. In fact some seem to think it is moving too rapidly, fearing as they do that too much labor is being abstracted from other pursuits and too much capital diverted from other channels of investment. The readjustment necessarily involved in the development of any extensive industry, such as that of the automobile, is likely to have transient effects here and there which are not desirable, but if the industry itself represents a social need the ultimate results must be to the general benefit.

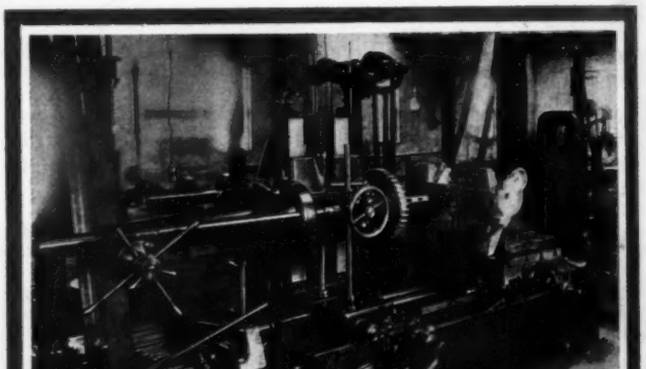


Fig. 10—New horizontal boring mill used in crankcase work for almost every operation

The automobile is the latest word in human progress, and because of its perfection as a vehicle for both business and pleasure, its use is certain to grow. It is not a luxury but a necessity of the times, and the fact that it is a necessity gives legitimate warrant to the use of capital and labor required by it. But granting that the automobile is a thing to be welcomed, the question arises whether there is a too rapid absorption of capital and labor in its production, and we hear some dark forebodings lest a financial panic may ensue because of it.

The automobile industry has reached a vigorous growth, but this is a very large and a very wealthy country, perfectly competent of taking care of any demands likely to be made on it by the development of the industry. The shifting from horse-drawn vehicles, an inevitable process, is going ahead rapidly, but not so rapidly as to test the resources of the country or come anywhere near doing it. From the labor standpoint it is quite evident that the industry is developing many new means of employment and increasing the purchasing power of the thousands at the present moment engaged in it.

# NEW ELECTRIC DISPLAYS NUMEROUS DIFFERENCES

ASIDE from the natural interest in things new and different, the electric car recently brought out by the Rae Electric Vehicle Company, Boston, marks a distinct advance in the electrical and mechanical construction of this type of car. The first machine, as shown at the electric show in Boston last month, had at that time run over 16,000 miles. In operation, it is claimed that this car will cover from 100 to 130 miles per battery charge, and irrespective of the number of stops. The latter feature is a new one, previous long radius cars obtaining that mileage only by making fast continuous runs.

By means of the control of this car, just brought out and patented, the starting and accelerating effort is produced by a normal discharge current, thus conserving the energy stored in the batteries and making a larger percentage of it available for mileage, which is the desideratum.

In appearance, as the illustration shows, the construction of the gasoline machine is followed very closely. So, too, with the mechanical features. The power unit is located at the front under the hood, the drive from there is by shaft to the rear axle, the latter being of the full floating type.

Of course, the batteries must be carried, but these are located in the center of the car, below the floor boards of the car. In this way, they do not affect either the appearance of the car, or interfere with the mechanical construction. More than all that, weight is thus placed over the rear wheels, from which they derive increased tractive effort. In addition, the simple lifting of the floor boards allows access to them for charging, inspection, or repairs. This latter feature of accessibility is fully as important as the others.

Not only is accessibility of the batteries made a feature, but the location of the motor and controller forward under the hood is also very accessible. By raising the hood, both are exposed. By removing four bolts, and disconnecting two wires, the power unit is removable. The separation of motor and battery into two separate and distinct units located at some distance apart is also effective in reducing battery leakages.

Sixteen speeds, varying from 3 to 20 miles per hour, are furnished by the controller in its various positions, the operation being such as to vary the field of the motor without external resistances. Noiselessness is made a great feature, being secured by the use of special gears, on short shafts, the latter being mounted upon radial ball bearings. They are well enclosed and run in oil at all times. This enclosing the gears in an oil bath, not only makes for noiselessness but materially aids the longevity of the gears themselves, to say nothing of the matter of reducing friction losses to an absolute minimum quantity.

Floating type of rear axle is an up-to-date feature of gasoline automobiles which has been borrowed to make this quiet running electric more perfect. The absence of driving chains makes the car even smoother and quieter in operation.

In the line of brakes, too, gasoline construction is followed very closely with the best of results. A set of rear wheel brakes, operated by foot lever, is provided, but in addition, there is a shaft brake, controlled through the continued movement of the same lever. Thus, to stop the car, the pedal is pressed lightly. If this is not effective, more pressure puts the shaft brake on, and a determined push of the pedal to the limit of its movement will put both brakes into instant use, resulting in the rapid stopping of the car.

Rae Electric Victoria, a New Car of Merit

Eighty-inch wheel base is the standard, with a 56-inch tread. Wheels are 32-inch diameter in front and 4 inch in the rear, equipped with either solid or pneumatic tires as desired. The springs are full elliptic both front and rear. The battery equipment is 40 Helios 15 A cells, divided into trays of four cells each, and suspended by steel racks from the laminated wood frame. The individual trays are each removable separately, while the supporting of the racks below the frame results in a very low center of gravity. The usual very complete equipment of tools, lamps, meters, etc., is provided.

Besides the victoria shown, the company will have ready for the 1910 season, equally well-designed coupé and runabout types of the Rae electric car. The factory is located at Springfield, Vt., but offices have been opened at 747 Bolyston street, Boston, from where orders will be filled.

# "JACKSON MUD HEN'S" TRIP FROM MICHIGAN TO MAINE

MONDAY morning, November 22, a mud-spattered automobile ploughed through the streets of Bangor, Me., and stopped in front of the City Hall, where Mayor John S. Woodman and a corps of city officials greeted it. The car was the "Jackson Mud Hen," driven by E. P. Blake, of Boston, and Charles Percival, of New York, who for the second time were carrying an official message from the mayor of Jackson, Mich., to the mayor of Bangor, Me. Last year Messrs. Blake and Percival made the same trip in the rain and snow in seven days and eleven hours, and this year, though they started three weeks later, were determined to lower their existing record.

Starting from Jackson at 9:22 a. m., on Wednesday, November 17; in a driving snowstorm, the two men made Toledo, 152 miles, through axle-deep mud and clay without a stop, arriving there at 4 a. m. After a hearty meal the run to Cleveland was resumed with the same road conditions, but a worse storm, the rain turning to snow. Cleveland was reached at 5 o'clock and when food had been partaken of, the 218-mile rough and hilly run to Buffalo was started. At Erie, Pa., a driving snowstorm was encountered which grew to 6 inches of snow by the time Buffalo was reached, in just 12 hours. Albany, N. Y., found them 42 hours ahead of record, and then the long climb over the famous Jacob's Ladder in the Berkshire Hills confronted them. This was made successfully, and midnight brought the "Mud Hens" into Springfield, Mass., where good roads to Boston awaited them. Reaching Boston Sunday morning the car started for Portland, Me., and made their stop for supper at Lewiston.

The all-night ride to Bangor, 165 miles, over the worst roads and mountains lay before the tourists, who successfully made it the next morning at 10:20, beating last year's mark by 2 days 12 hours and 45 minutes and establishing a mark for continuous driving of 123 hours.

THE AUTOMOBILE

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## THE DUTY OF THE MOMENT

Lawless and criminal users of the road must be driven from it, and in the accomplishment of this imperative duty of the moment the law-abiding autoists must come squarely into the open and aid in the suppression of the few who cast discredit upon the great army of motor vehicle owners.

Recent fatalities, intermingled with narrow escapes and numerous minor incidents, have aroused in New York City an unreasoning antagonism toward automobiles which has caused thousands of considerate owners great inconvenience and, in some cases, positive persecution. The startling rapidity with which horse-drawn vehicles are being replaced by motor-driven cars brings in its wake a daily chapter of accidents that come from the participation of incompetent drivers in the congested traffic of the metropolis. Along with these are the skillful ones who take chances with slight regard to the other occupants of the streets, the poor pedestrians suffering the most as a natural sequence of their inability always to escape the savage assaults of these murderously-inclined beings who belong behind prison bars.

The New York State law may have answered well enough when the number of automobiles was small and their increase comparatively gradual, but the needs now call for a law which would compel the licensing of every person who sits at the wheel, with penalties severe and a cell in sight for those who trespass upon the rights of other occupants of the highways. A permanent revocation of license should follow a third offence, for this repeated disregard of the law would be proof sufficient that the guilty one was not a suitable person to be entrusted with the driving of an automobile.

And, furthermore, the automobile should carry identification marks which would insure prompt apprehension whenever its steersman violated the law knowingly. The miles-per-hour clause, however, should be eliminated from the statute, for its continuance in a drastic law unquestionably would bring injustice and unfair treatment to many whose only offence would be in exceeding ridiculously low speed limits without harming or endangering anyone.

New York State is a criterion for many other commonwealths, but its automobile law, for various reasons, has fallen behind the times, and the evidence of it painfully exists in the appalling list of accidents in the largest city of the country.

There is a temper which bodes ill for all users of the automobile in the Empire State, unless its State association comes forward with an amended law which shall make possible the punishment of the guilty and their permanent disappearance from the highways. Revocation of licenses and licenses for all drivers, with legible identification both day and night, will rid the highways of those who should not be at large, and will place these runners-amuck where they belong.

Some day the American Automobile Association will be successful in obtaining a uniform federal law that will apply to the whole country. In the meantime, each State will have to do its own regulating, and New York has lagged behind the procession, and, though it has been owing to an involved train of circumstances, behind this commonwealth is, and should be brought up to date in its automobile law.

## WHAT OLYMPIA'S EXHIBIT SHOWS

At the great Olympia automobile show, which has just closed in London, and which might well be called *the* foreign show of the year, there was no sensation like last year. Then, it will be remembered that the now-famous Knight engine was brought forth with much rhetoric as to the future disposition of all other types, the scrap heap being the place for them according to the Knight.

After a year's trial, it may be said that the slide valve has held its own, that is, there has been some slight gain in the number of makers which have taken it up. The gain, however, was far from the predictions of the inventor. So, the scrap heap is a good ways off yet.

On the other hand noticeable gains have been made by many forms of construction, and these, too, of a nature which means lowered first cost, reduced upkeep, and greater simplicity. As exemplifying this may be cited the fact that the greatest gain of all was in the class of small cars, powered with four-cylinder engines of from 10 to 18 rating. Nearly all of these had all four cylinders cast in a block, thermo-syphon cooling, fan type of flywheel eliminating the forward fan, improved accessibility of all parts, more attention paid to carbureters and the carburetion problem, and a marked tendency toward the torpedo body even for but two passengers.

# PALACE SHOW WILL HAVE 325 EXHIBITORS

NEARLY 325 exhibitors will be in their respective places when the doors of the Tenth International Automobile Show in the Grand Central Palace, New York, are thrown open for the private view at 3 o'clock on the last day of the old year. A better array of automobile and accessory exhibits was never gathered under one roof.

Among the big makers of automobiles who will be present at the Palace are: Premier, Maxwell, Ford, Reo, Stoddard-Dayton, Mitchell, Brush, Jackson, Mora, National and Marmon. The foreign cars will, as usual, be lined up with the Americans, and their ranks will include Panhard, C. G. V., Renault, Fiat, Delahaye, Delaunay-Belleville, Lancia, Clement-Bayard, De Dion, Isotta and Hotchkiss.

Altogether there are 84 exhibitors of automobiles, by far the greatest number ever shown before in New York. Of these 72 are American and 12 foreign. The foreign importers say that they will have the best exhibit of foreign cars ever before seen in this country. The European makers are rushing their 1910 models to completion, and some of them will be shipped to America within the next two weeks.

So great has been the demand for space by the accessory makers that every available square foot of floor space has been brought into play. One hundred and one of the biggest concerns, members of the Motor and Accessory Manufacturers, have been allotted space, and considerably over a hundred independent concerns have had their wants filled. There is no question in the minds of those who have followed the expansion of automobile shows that this is the greatest number of exhibitors ever housed in this country. A feature of the show will be the unusually large number of new makes which have never before been shown.

## THE GARDEN VARIETY OF SHOW GIRL

In the search for an attractive poster for the Tenth National Automobile Show, which will be held in Madison Square Garden, New York, January 8 to 15, the managers have hit on one which is not half as bad as the usual run. Instead of the usual winged Mercury or other allegorical figure, the Garden poster is simply a typical American girl, clad in complete automobiling costume. The picture is in keeping with the plans of the committee to make the exhibition and everything connected with it truly national in character.

Madison Square Garden Show Girl

The poster was made by an artist, so it is said, and from a life study. According to the story, the model was a woman well known in automobiling circles, whose pictures have appeared in the trade columns more than once during the past year or two. Because she objected to having a full-face portrait made and would permit only a profile, the artist was much perplexed to find a pose that would take the place of the one he had planned. The young woman, who is something of an artist herself, solved the situation by striking a graceful posture that was immediately approved. She seems to be drawing the beholder's attention to the sign: "Tenth National Automobile Show."

The color scheme is built around the girl's long automobile cloak of brilliant scarlet, with flowing veil and the latest in automobile head-gear. She is expected to be known as "Miss Posy," not because of her attitude, but because she is the real Garden variety of show girl.

## MONTREAL SHOW WILL INCLUDE 'PLANES

MONTREAL, Nov. 27—Montreal will have an automobile show just after the horse show, which would bring it in the week March 26 to April 2. The show will be held under the auspices of the Canadian Automobile and Aero Club. A new feature this year will be the exhibition of a number of dirigibles and aeroplanes. The decision to hold the show was reached at a meeting held recently, and further meetings will be necessary to decide on the details.

## MANY CARS DEBUT AT DETROIT SHOW

DETROIT, Nov. 29—From the standpoint of varied exhibits the forthcoming show under the auspices of the Detroit Auto Dealers' Association will have but two rivals, New York and Chicago. The Atlanta show set a strong pace in the matter of comprehensiveness, for there were but few less than fifty different makes of cars shown there; but Detroit has already passed this mark. With the show still a month away, fifty-two manufacturers have made application for space, either directly or through their agents.

Detroiters will be able to gain even more satisfaction from the show than has been the case in the past, for here will be shown the progress made during a twelvemonth in the hub of the automobile industry of the world. Last year twenty-six makes of cars were on exhibition. This year there will be more than that number of new ones alone. Cars that will be shown locally for the first time include the Lion, Krit, Warren-Detroit, Detroit-Dearborn, Paige-Detroit, Demot, Anhut, Parry, Paterson, Michigan, Hudson, Studebaker-Flanders, Everitt and VanDyke.

Manager Gillespie and his aides are already busy on the details. Contractor Buelow, who was responsible for last year's decorative efforts, is again in charge, and promises to eclipse all his previous records. The Wayne Hotel Gardens will again be utilized. Every available foot of space has already been taken by exhibitors; in fact, the demand was so great that the customary motorcycle exhibit had to be dispensed with.

## DATE APPOINTED FOR HARTFORD SHOW

HARTFORD, CONN., Nov. 29—At a meeting of the Automobile Dealers' Association last week a permanent show committee for the season of 1910 was appointed, and the show dates were set at from February 14 to 19 inclusive. Fred W. Dart, E. G. Biddle and W. L. Ledger form the committee. Messrs. Dart and Biddle served on the show committee last year, and did good work, as did also Samuel A. Miner, the retired member. The committee has cast longing eyes at the new State arsenal and armory, but it seems to be a case of "nothing doing" here. Foot Guard Hall will therefore probably be the selection, this year as last, and plans for decoration are already under way. The last show was a beauty, from the decorative point of view, but the committee assures the dealers that the coming show will outstrip all previous efforts, both as to beauty and utilization of space.

**Grand Forks, N. D.**—This city is to have its first automobile show when the farming-implement men of North Dakota and Northwestern Minnesota meet for their annual convention during the first week of February.

## TWO BUSY AUTO MAKERS IN ST. LOUIS

St. Louis, Nov. 26—The Dorris Motor Car Company has its plant well equipped wtih special machine tools and such jigs, fixtures, etc., as are characterized to afford interchangeable work, and according to President H. B. Krenning, of the company, the product for 1910 is placed and deliveries will be made on time. Dorris Cars, as they are to be placed in the hands of 1910 users, will have many little refinements, and the care with which the work is done, nearly every part being made in the Dorris shop, offers splendid assurance of satisfaction.

The Moon Motor Car Company, with a shop full of the latest and most capable machine tools, is pushing the work on the new model, which is a "Thirty." Attention is called to the road wheels, which are of special design, with spokes so shaped that they are not only capable of taking the load at the felloe, due to liberal bearing surfaces, but they are fashioned as the Indian's bow, to give at a certain point, the object being to prevent loosening up at the miter.

Among the parts-makers, the More-Jones Company, is now busy on a line of brass, bronze and aluminum castings for use in automobiles. It is the claim of the company that all its work will be up to a high standard, due to the use of new brass, selected aluminum (without scrap), and methods in the foundry that years of experience made possible.

The Medart Patent Pulley Company is specializing on automobile motor flywheels, and due to the character of the mixture used, as well as the process employed, it is found by experience of makers of automobiles who have tried this product, that the flywheels are up to a high standard. The facilities of the company are such that a considerable trade can be accommodated and deliveries are prompt.

The Maxwell-Briscoe Motor Vehicle Company is now located on Twelfth Street, between St. Charles and Olive. This location, in St. Louis, is regarded as advantageous by knowing ones, and "Maxwell," in a big electric sign, heralds the location to all who read.

The Anti-Selenite Company, manufacturers of carbon remover, has been succeeded by the Parham-Goudy Company, and is pushing out for business with its well-established product.

The Petrie-Phillips Company has just received the Parry demonstrating car and is rapidly filling demonstrating engagements, and from appearances, will put out all the cars of this make that can be assigned to this territory; the Parry car is attracting notice.

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**New London, Conn.**—Carruthers & Keeney have opened the Thames garage at 123 Bank street, where they have the agency for the Mitchell. For Mitchell owners they have a proposition to keep cars oiled and adjusted for $5 a month; this includes grinding of valves when necessary, and a complete monthly inspection of the car.

## PROSPERITY RULES IN INDIANAPOLIS

Indianapolis, Nov. 26—The Cole Motor Car Company has completed its plans to increase the 1910 output by 300 cars; this concern, due tc skill displayed in meeting the wants of discriminating buyers, is finding it quite easy to dispose of all the cars it is in a position to produce, and it prefers to limit the output to that number of cars which can be built right.

The Diamond Chain Company, with largely increased facilities, is putting out more chain than ever, and in its attempt to maintain its high standard, offers aid, of a character which counts, to every user of sprocket wheels and chains, even to the extent of furnishing properly cut sprockets.

The Superior Machine Tool Company, of Kokoma, builder of milling machines, is now, according to Raymond Ruddell, president, preparing to build transmissions, of a high character, for makers of automobiles; details of the plan are well in hand.

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## NEW KRIT CAR, BUILT IN DETROIT

Detroit, Nov. 27—Though only incorporated two months ago, the Krit Motor Car Company is already established in its factory, with 25,000 square feet of floor space available, and is turning out cars. The company, which is capitalized at $100,000, has for president Claude S. Briggs, and W. S. Piggins, B. C. Laughlin and Kenneth Crittenden as secretary, treasurer and designer, respectively. The officers, together with Charles E. Kanter, F. J. Armstrong, P. F. Luyster, C. W. Whitston, William Reed-Hill, Thomas Harris and Hugh Barry are the directors.

The Krit is a roadster, of rakish lines, 22 horsepower and weighing only 1,250 pounds. The body is finished in a new and distinctive shade of burnt orange. It is low hung, with liberal leg room, and the steering column and levers are on the left side.

The motor has four cylinders, 3 3-4 by 4 inches, cast *en bloc*, and forms a single unit with the change-gear. The clutch is multiple-disc, running in oil. A Bosch high-tension magneto is furnished regularly. The front axle is a neatly designed I-beam, and the rear, being live, is ball bearing throughout. Two sets of internal-expanding brakes are provided. The wheelbase is 96 inches, and the tires 32 by 3. The car complete sells for $800.

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## NEW YORK TRADE NEATLY VICTIMIZED

Already feeling the Christmas spirit, a number of tradesmen along New York's automobile row responded generously to the appeals of an alleged Western Union messenger boy for donations to the "messenger boys' holiday fund." The fraud was detected bv A. K. Ainlay, manager of the Western Union office at 1771 Broadway, and a general warning has been issued. The offender is described as short and thick-set, about thirty years old, and using the name of James Collins. He is believed to have got away with $180 of the row's hard-earned money.

Four of the Maxwell-Briscoe Motor Company's Busy Plants Grouped Together Show Magnitude

**Stearns Landaulet of the 15-30 Model on a Picturesque Road Near Cleveland**

The body, of the combination limousine-landaulet type, is one that has found favor through its roominess and elegant appearance. The photograph also shows the demountable rims which are now stock equipment

**Auto Carries Telephone**—In a reliability run between San Antonio and Dallas, Tex., D. A. Walker, the president of a local telephone company, was among the entrants, and his car, a Rambler, carried a portable telephone. By means of a long fishing pole with a hook at the end, Mr. Walker was able at any time to make connection with "central," and talk from the instrument in his car. Points ahead were kept informed of the progress of the cars in the run, and in case of break-down messages to bring assistance were sent. One day arrangements were made for the Governor of Texas to be entertained by the tourists.

**Trip of Inter-State "Bulldog"**—An Inter-State car reached Syracuse, N. Y., Wednesday afternoon after a thousand-mile run from the factory at Muncie, Ind. Fred Fisher drove the car, and the rest of the party was composed of Mr. and Mrs. George J. Arnold, Miss Marion Coogan and Harry S. Brockway. As a result of the trip the George J. Arnold Company has placed an order for 150 Inter-State cars to sell in this district. Frightful road conditions were encountered in Indiana and Ohio, and near Bucyrus the car became so badly bogged that boards had to be used.

**Franklin to Run a Garage**—The H. H. Franklin Mfg. Co. has leased the former Crosby garage at Montgomery and Water streets, Syracuse, N. Y., which will be used for repair purposes and the display of second-hand cars. The building has three floors, equipped with the most modern machinery and electric power, with a two-ton elevator. It is stated by officers of the company that this is the forerunner of a model garage and show-room which will be erected later. It will contain the offices of the selling force of the Syracuse branch and will be open for business in two weeks.

**First Badger Appears**—The Badger Motor Car Company, of Columbus, Wis., on Thanksgiving Day shipped its first finished product, a four-cylinder, 30-horsepower Badger, to Webb, Jay & Company, Michigan avenue, Chicago. The company expects to be turning out fifteen or twenty cars a week as soon as its new factory is completed. Considerable difficulty has been encountered in obtaining material promptly. The Badger is finished in Brewster green, with dark-red running gear.

**Federal Rubber's Capital**—The Federal Rubber Company, of Cudahy, Wis., has increased its capital to $620,000, all paid in, and is contemplating a further increase to $750,000 by January 1. A new building has been completed and put in operation which has a capacity of 250 tires and 500 inner tubes a day. The factory is running till 9 p. m. in all departments. Agencies have been opened in Atlanta, Ga., with the Dunham Rubber Company, in St. Louis with the Phœnix Auto Supply Company, and in Kansas City, Mo., with the Motor Tire & Supply Company.

**Atlanta Trophy in New York**—The $10,000 City of Atlanta trophy, which was won by Louis Disbrow on his Rainier, has arrived in New York and is on exhibition at the Rainier showrooms, Sixty-fourth street and Broadway. The trophy is of gold and stands 30 inches high. Disbrow's Rainier made the 200 miles necessary to win the trophy in 173 minutes at the rate of 69.4 miles an hour. The car did not make a single stop, but reeled off lap after lap without varying five seconds.

**To Make Magnetos**—The Whelchel Electric Company, of Anderson, Ind., was organized August 20 to make medium-priced magnetos, and the company's product is just appearing on the market. Bert Whelchel, who has been engaged in magneto manufacturing for seven years, is president of the company. John W. Jones, A. S. McCall and John Rickes, all prominent business men of Anderson, are vice-president, secretary and treasurer respectively. The company has secured a plant at the corner of Third and John streets.

**Auto-Car Now Atterbury**—The Auto-Car Mfg. Co., of Buffalo, N. Y., one of the oldest builders of commercial cars in America, has changed its name to the Atterbury Motor Car Company. The company's product will continue to be known as the "Buffalo" cars. One object of the change was to avoid the confusion of names with the Autocar Company, of Ardmore, Pa. The Atterbury catalog is now out, showing a complete line of gasoline and electric commercial vehicles.

**"Pop" Lowe Sells Midlands**—The agency for Midland cars in New England has been taken by the Henderson-Lowe Company, of 117 Massachusetts avenue. This company is composed of Dr. Chas. R. Henderson, who is well known in and around Boston as an automobile enthusiast, and George H. Lowe, familiarly known as "Pop" Lowe. Mr. Lowe has been in the automobile trade for many years, and will have the active charge of the management.

**Heating System of Milwaukeean**—The new $500,000 plant of the A. O. Smith Company at Milwaukee, Wis., where pressed steel frames and other parts are made, will be heated by a new system invented by Jesse C. Coogan, of Milwaukee. The exhaust from the gas engines in the power plant will be conducted through the factory into radiators filled with water. The system is being installed in several other factories in different parts of the country.

**New Muskegon, Mich., Company**—The Henry Motor Car Company has been organized at Muskegon, Mich., to take over the business of the Gary Taxicab Company, formerly of Chicago. It is capitalized at $200,000. D. W. Henry, the general manager, says that the company will make for the coming season a thousand cars to sell at from $1,600 to $1,700. A factory building, 110 by 550 feet, has been completed, and deliveries are expected to begin January 1.

**Automobile Garage Located Under the Bleachers of a Baseball Park**

The new Pittsburg branch of the Studebaker Company is built directly under the seats of Forbes Field, the home grounds of the world's champion Pirates. Naturally much business is done with the Pittsburg fans

**"High Wheel" Now "Muncie"**—The High Wheel Auto Parts Company has changed its name to the Muncie Gear Works, as the old name proved misleading. In addition to parts for high-wheelers, the company makes differentials, steering and change-gears for standard-type automobiles. The company continues in its former location at Muncie, Ind., with H. L. Warner as manager.

**Ferro Foundry Banquet**—The Ferro Machine & Foundry Company gave a banquet to its foundry organization to celebrate a record of 1,100 castings a day, which is thought to be a noteworthy feat. The company has built an entirely new machine shop and a new core room, and has enlarged other departments; the working force has been increased from 700 to 1,100 men.

**American Trucks Abroad**—There seems to be quite a demand for American-built commercial cars abroad. The Grabowsky Power Wagon Company, of Detroit, reports the sale recently of three Grabowsky sight-seeing or passenger cars in Corunna, Spain, and says there are a number of other prospects which may be favorably closed up soon.

**Wright 'Planes in Germany**—Wrights, Ltd., Berlin, are busy turning out aeroplanes at the works at Reineckendorf, which will be extended as soon as occasion permits. The motors are being manufactured at various German plants, an order for ten having been placed with the Neue Automobil Gesellschaft at Marienfeld.

**Meteor Plant Sold**—The Bettendorf Axle Company has bought the factory and land of the Meteor Motor Car Company in Bettendorf, a suburb of Davenport, Ia. The building, which was badly damaged in a fire last Summer, will be used temporarily for storage purposes.

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### IN AND ABOUT THE AGENCIES

**Speedwell Agencies**—George L. Baker, sales manager of the Speedwell Motor Car Company, of Dayton, O., has secured the following agencies: The Speedwell Company of Cincinnati, 228 East Sixth street, Cincinnati; Electric Construction & Motor Company, Findlay, O.; Central Motor Company, Hamilton, O.; Canton Motor Car Company, Canton, O.; S. Siegert & Sons, Coshocton, O.; Park Motor Car Co., 10215 Superior avenue, Cleveland, O.; Kimmel Bros., 170 North Fourth street, Columbus, O.; Frank Hilt, Tenth and Madison streets, Toledo, O.

**Continental Tires, Los Angeles, Cal.**—The Continental Caoutchouc Company has arranged for an agency in Los Angeles, Cal. This will be in charge of the E. A. Featherstone Company, 1018 South Main street. The territory will include Southern Colorado, Arizona and a portion of Nevada.

**Palmer-Singer, Detroit**—The Palmer-Singer will in the future be represented in Detroit by the Bemb Motor Sales Company, which was recently organized. Walter Bemb, who for many years has been connected with the J. H. Brady Company, is general manager.

**Rainier, Georgia and Alabama**—Paul N. Lineberger, vice-president of the Rainier Motor Car Company, announces the appointment of W. H. Johnston and H. H. Tift as Rainier agents for the States of Alabama and Georgia, respectively, with headquarters at Birmingham and Atlanta.

**"Times Square," Philadelphia**—The Times Square Automobile Company, of New York, which deals in second-hand automobiles, has opened its fifth branch house, this one in Philadelphia, at 238 North Broad street. The show rooms and repair shop have some 9,000 sq. ft.

**Ford, Pittsburg**—The Ford Motor Company has opened temporary branch headquarters in the Rittenhouse block on North Highland avenue, with F. E. Weir as local manager, and is seeking a permanent location.

**Premier, Reo and Sterling, Pittsburg**—The Premier Sales Company, Ltd., which handles the Premier, Reo and Sterling cars, moved December 1 to its new garage at Beatty and Mignonette streets, East End.

**Buick, Syracuse, N. Y.**—Strait & Shaw have succeeded to the business of the Syracuse branch of the Buick Motor Company, at 223 West Genesee street, with seven counties in central New York as their territory.

**Studebaker, Warren, O.**—Vanwye and Hitchcock, of Warren, O., doing business under the title of the Hitchcock Motor Company, have secured the agency for the Studebaker cars in Trumbull County, O.

**Mercer, Philadelphia**—Frank Fanning has secured the Quaker City agency for the Mercer, built by the Mercer Automobile Company, of Trenton, N. J., and is looking for a "row" location.

**Hupmobile, Houston, Tex.**—J. F. Sigmond has been appointed agent for the Hupmobile, and for the present will be at the Palace Automobile, Company, Rusk and Louisiana streets.

**Stoddard-Dayton, Chicago**—The McDuffee Company, Chicago, agent for the Stoddard-Dayton, will remove December 1 to a new building at Twenty-third street and Michigan avenue.

**Cole and Paige-Detroit, Philadelphia**—The Colt-Stratton Company will within a few days establish an agency in Philadelphia to handle the Cole and the Paige-Detroit.

**Austin, Atlanta, Ga.**—The Atlanta Motor Agency, of 91 North Pryor street, has been appointed local representative for the Austin, manufactured in Grand Rapids, Mich.

**Pullman, Philadelphia**—While awaiting completion of its building at 257 North Broad street, the Longstreth Company has opened an office at 912 Chestnut street.

**Courier, Philadelphia**—The Stoddard-Dayton Company, of Philadelphia, has contracted to handle another Dayton product, the new Courier.

Parry, **Philadelphia**—The Continental Motor Car Company, agent for the Speedwell, will also represent the Parry in Philadelphia.

### PERSONAL TRADE MENTION

**S. L. Nicholson** has been appointed general sales manager of the Westinghouse Electric & Mfg. Co., with direct charge over the sales policy of the entire company. He has been with the company for 11 years, in various capacities.

**A. B. Cordner,** formerly the head of the A. B. Cordner Motor Car Company, has been appointed New York manager of the Rapid Motor Vehicle Company, and will open an office at Broadway and 64th street this week.

**"Billy" Crawford,** known in Philadelphia through his work in various endurance runs, in which he drove Franklins and Cadillacs, has signed with the sales force of the Jackson Motor Company.

**Eugene R. Mertens,** for eleven years associated with the Columbia Motor Car Company and the Electric Vehicle Company, has left for Detroit, where he will continue in the industry.

**"Wally" Owen,** who drove the Rainier No. 8 in the last Brighton 24-hour race, has signed a contract to sell Rainier cars at the Rainier New York branch, Sixty-fourth street and Broadway.

**Frank F. Weston** is now manager of the automobile parts department of the U. T. Hungerford Brass & Copper Company, of New York, which makes novelties in brass and copper.

**G. Brewer Griffin** is now manager of the detail and supply department of the Westinghouse Electric & Mfg. Co., of which he has been assistant manager for six years past.

**A. N. Bentley** has been made manager of the Southern sales office of the Electric Storage Battery Company, of Philadelphia, in place of H. H. Seaman, resigned.

**Charles Robbins,** who for several years has been in the industrial motor section of the Westinghouse Electric & Mfg. Co., has been appointed manager of this dept.

### GOODYEAR CONTROLS DOOLITTLE RIM

AKRON, O., Nov. 27—The Goodyear Tire & Rubber Company has secured the exclusive American rights to sell the Doolittle demountable-detachable rims, which have shown up well in several racing events of the past season. It is said that during one of the Brighton Beach 24-hour races, in which two cars were equipped with these rims, 54 tire changes were made, some of them taking as little as 28 seconds.

The feature of this rim, which is the invention of Dr. Perry E. Doolittle, of Toronto, is the ease with which tires can be changed on it; an advantage not often found in connection with a demountable rim. The steel rim proper is divided at one point, and is arranged to be expanded or contracted by means of turnbuckles, the first operation removing the rim from the wheel and the second removing the tire from the rim.

As a result of its investigations the Goodyear Company concluded to adopt the Doolittle rim. Negotiations have been finally completed, and within a few days the rims will be on sale at all the Goodyear branches and agencies. Demonstrating wheels are being prepared to show the operation of the rim. The Goodyear Company will also exhibit the rim at all the shows this winter.

### RETIREMENT OF W. HILDRETH

CHICAGO, Nov. 27—After seven years of close application to business as vice-president and manager of the Holsman Automobile Company, W. Hildreth has resigned to take a long-deferred vacation. He expects to spend several months in travel and recreation before taking up business again.

Mr. Hildreth's retirement was the occasion of a farewell banquet given at the Chicago Automobile Club to the directors and office employees of the Holsman Automobile Company last Monday. In the photograph Mr. Hildreth is seen at the head of the table, with Mr. Holsman at his right hand.

Seven years ago Mr. Hildreth helped organize the Holsman Automobile Company, and has been its vice-president and general manager ever since. He has always been a firm believer in hill-climbs and reliability runs, and has entered machines in them whenever possible; he has also been a strong advocate of advertising. As a member of the ways and means committee of the Chicago Association of Commerce he was a delegate to the National Tariff Commission convention in Indianapolis, and served on the "foreign trade" and "automobile" committees of the same body. Mr. Hildreth has always carried membership in the various automobile clubs and trade associations.

### ANOTHER SYRACUSE, N. Y., FACTORY

SYRACUSE, N. Y., Nov. 27—Unless some unanticipated hitch occurs in the final construction work or the installation of machinery, the new automobile factory, built by Harvey A. Meyer at Wolf and Park streets, will start operations with 100 men soon after January 1. Mr. Meyer has planned to market 200 automobiles next year, and the working force will be increased by degrees with that end in view. The site and buildings involve an investment of $50,000.

The main building is 150 by 60 feet, four stories high, and the smaller one 117 by 30 feet, one story high. Both are of brick and modern in every way. Mr. Moyer has some vacant property adjoining which may be used in the future for more buildings.

### NEW CAR TO BURN KEROSENE

DAYTON, O., Nov. 29—Business men here are forming a new concern known as the Kero-Car Motor Company to build an automobile driven, as the name indicates, by a kerosene engine. The new engine is said not to be a freak, either in appearance or operation, closely resembling the standard automobile engine. It will burn, however, either gasoline, kerosene or alcohol.

**Farewell Banquet Given by Manager Hildreth to Holsman Office Staff**

# Information for Auto Users

**U. & H. Dual Ignition System**—In connection with the latest U. & H. magneto intended for dual ignition, as imported by the J. S. Bretz Company, a coil box and switch for the battery circuit is furnished, to be mounted on the dash. With this magneto practically two systems of ignition are secured. Both use the same set of plugs, thus simplifying the wiring and avoiding the fouling of the idle set, which often occurs when two sets are used.

The magneto, like all U. & H. magnetos, is of the true high-tension type; the coil is used only in the battery circuit. The battery timer is incorporated in the magneto, as an integral part. The distributor handles both magneto and battery current, and is of a type which

NEW U. & H. COIL BOX AND SWITCH

prevents the burning of the insulation by sparks playing across when an attempt is made to start the motor on the spark.

The magneto is furnished with the regular U. & H. design circuit-breaker, which is said to require no adjustment, and with the U. & H. timing-pin device, by means of which the magneto is set in correct relation with the motor when first being attached, preventing any likelihood of error in this little understood operation. The magneto shafts are mounted on ball-bearings. This dual system is particularly valuable for motors which are too large to be easily cranked for starting, allowing as it does the motor to be started on the spark even after stops of considerable length.

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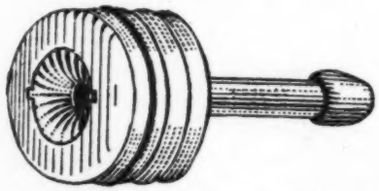
**New Pump Attachment**—The lack of universality in pump attachments has at various times been the cause of much confusion, not to say profanity. This trouble will be obviated by a new device just placed on the market by H. K. Austin & Company, Reading, Mass. It is called a patent flexible coupling, from the fact that it is used to couple the pump to the valve of the tire to be inflated. The construction is such that it



AUSTIN FLEXIBLE PUMP COUPLING

fits all tire valves, and may be used with any make or size of pump. This makes it universal in two ways. This universality is obtained by the use of a rubber nipple, which has a peculiar opening through it. The outer end of this nipple has a rounded or beveled hole leading to an interior hole of apparently one size. This is not the case, however, as the inside expands again, forming a Venturi-shaped interior chamber. Beyond this the aperture is of one diameter through the rubber and the brass cap holding it. The object of the expanded chamber and peculiar shape of the interior is twofold. First, it slips over the tire valve readily, and, second, it not only grasps the latter tightly, but in locking over it the hole is constricted so that air may not escape through it. In this way, if the tire valve was leaking, the sides of the air chamber would lock and hold the air.

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**New Light Type Front Axle**—To go with the light weight rear axle, suited to the lightest types of cars, and described in these columns recently, the Long Arm System Company, Cleveland, have brought out a front axle of similar light weight which incorporates a number of most excellent features. This, as the cut shows, is forged up in a single piece with the spring seats forged integrally. The latter are given a broad space for the spring to rest upon. The thrust of road shocks is well taken up by this construction, while the load stresses are sustained by a single ball of very large diameter. Though shown with ball bearings, this axle may be had with rollers or any form of bearings preferred. The reach rod is placed in the rear of the axle to protect it from inequalities of the road, but on special order they may be had, without additional expense, placed at the front.

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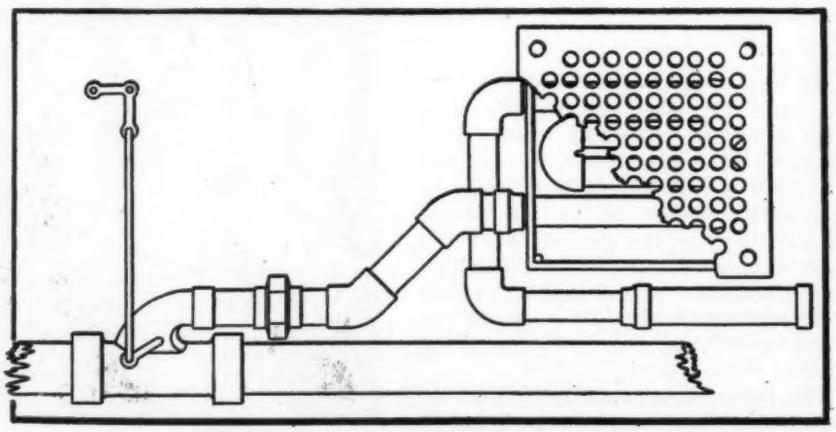
**"American" Auto-Heater**—This is a device for heating the car in Winter by the exhaust gases. It consists of a receptacle 10 inches square by 3 inches deep, fitted in the floor of the car, which contains a coil of radiating tubes. One end of the coil connects to the exhaust pipe, in front of the muffler; a valve is provided which is clamped over a small hole cut in the pipe, without disturbing the fixtures at either end. The valve flap which, when the device is out of use, covers the opening into the coil, swings down into the main exhaust pipe when opened, so as to deflect more or less of the gases into the coil. The other end of the coil has a small muffler to deaden any sound. The heater valve is operated by means of a small hickey which is usually placed on the riser of the front seat.

In any of the closed types of automobile bodies the temperature in zero weather can be brought up to 70 degrees in a few minutes. In an open car, of course, the heat is not so well retained, but by keeping the heater constantly turned on the car can be made quite comfortable. The heater is sold by Flavius C. W. Sudrow, 15 West Swan street, Buffalo, N. Y.



AMERICAN CAR HEATER FOR USE IN WINTER UTILIZES EXHAUST GASES